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D. Hayes Agnew, M.D
With the affectionate regards of
S. Agnew
Philada May 29th 1858

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[Notes on Rush's lectures]

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Lecture 2d.

Gentlemen, the next subject on which I propose to Treat is, the different methods of acquiring Medical Knowledge.

They are three fold, 1st From Books. 2nd From Lectures, & 3rd From a careful attention to the Symptoms & Changes of diseases as they occur in the Practice of Physic. Of the conveniencies & inconveniencies necessarily attendant upon each of these, I shall proceed to Treat.

First of Books. From these we may acquire a general ~~knowledge~~ account of the principal Characteristic marks of different diseases, & of their common Symptoms: But this method of studying Physic is liable to many Inconveniences. Books are (almost universally) mere coppies of each other. Nature is not adhered to with sufficient strictness in the different writings on Medicine. Most of the late works are compilations of those

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which are more Antient; & many works are forged, even names are assumed which do not exist. There is no Dr Manning in Europe, & yet we have "Manning's Diseases of Children", & Diseases of ~~[illegible]~~ Women, &c. The minute Symptoms & Variations of in the Pulse are not are not taken sufficient notice of; indeed, the minute variations of the Pulse, no man can have any Idea of from reading. They can only be acqu~~ainted~~ired by the third mode.

Secondly. Lectures. These are preferable to Books inasmuch as they contain accounts of the New discoveries, & Theories in Medicine. Another advantage of Lectures is, that they are retained more forceably than what we read. The Eyes sooner forget than the Ears (Haller) hence old persons seldom recollect the friends of their youth till they hear them speak. This method of communicating Knowledge by Lectures, took rise from Zeno, who delivered discourses on Philosophic subjects from porches. Diogenes the Cynic from his tub. – And the Peripatetics – while walking in the morning & evenings. This mode was perhaps interrupted by the discovery of the art of Printing.

& I shall proceed to give you a few directions

with respect to the best methods of conducting yourselves with respect to the Lectures.

In the first place be punctual in your attendance on the lectures; the loss of a single lecture or even only a part of a lecture, will sometimes break the thread which connects the different subjects together, and may even render a whole course unintelligable.

2ndly Donot take notes from the Lectures which you hear, if you do, dont coppy them during the continuance of the course: notewriting distracts your attention & prevents your acquiring the Ideas of the Professor; your time may be much better employed than in coppying your notes during the course of the lectures; it is too mechanical an employment: during my studies in Edinburgh, I recollect, that the Students who understood the lectures best, were those who did not write Notes; it is true, they were Students of 7 or 8 years standing. Such of you as attend only one or two courses had better perhaps, take notes, but observe the directions above given not to coppy them till the end of the course.

3d. Dont attend too many professors at a time: The last lectures you hear will infallibly prevent your recollecting the preceeding previous ones, at least with any degree of precision: Your Ideas will be vague and confused.

4th Make it a constant practice to talk over the subject of the Lectures to a friend: This serves as a test whether you remember it. The conversation will tend to fix it more firmly on your memory. If you cannot expreſs the Ideas which you have derived from the Lectures, you may rest aſsured you do not understand it.

Lastly, by a carefull attention to the Symtoms and Changes of Disease, as they appear in the Practice of Physic. This is undoubtedly the best method of learning the cure of Diseases. The discription of diseases as they occur in Europe are by nomeans applicable to such as occur in the United states. Till within a few years the English and American Poets immitated the writings of Virgil, and all our Poems exhibited Romanners and customs. The British and American Painters immitated Raphael, and our pictures exhibited Italian Landscapes. Our countryman Mr. West first attempted to deviate from this absurd custom; his paintings are very justly admired by Amateurs. In the same manner, till the time of the illustrious Sydenham & Morton, our books of medicine exhibited an account of Greek & Roman practice, and were in reallity mere copies from Greek & Roman authors. Within these 30 or 40 years Physicians have laid aside these folies and attempted the true Hyppocratic art of studying medicine

I do not mean by studying the works of this great man, but by observing carefully diseases as they occur, and making observations for themselves, hence we explain the fact that within the 30 or 40 years last past more important improvements have been made than within the 100 years preceding. Nature, I repeat must be your guide; let her be observed with attention; this is the more necessary in North America on account of our Diseases which are widely different from those of the West-Indies and Europe . . . .

. . . .

An American Physician will in vain attempt to cure diseases which occur only in our Country by European practice, or by that of the West or East Indies. Many an American has lost his life under the care of the most eminent British Physicians, for the mild practice which they use pursue being incapable of subduing a disease of such force as that they encountered. Again, – the diseases of our own contry afford us a strong argument in proof of this position; our Epidemics, for Instance; When have we had two Epidemics alike in all their symtoms? They never are alike in different Seasons.

2d By observing nature and visiting the sick a knowledge of the pulse can only be acquired; this ~~kno~~ knowledge I repeat again can only be had by pre-

frequenting the bedside of our patients. By visiting the sick you acquire a knowledge of symtoms— which cannot be described in books, as the minute variations in the pulse, change in countenance, voice, & excretions, Urine &c.— By observing Nature the combinations of diseases can be learned, and this is never done from books; no book which I have ever read gave an account of these combinations; thus for instance, how frequently are Hysteria and Worms complicated? and what Authors will you find teaching the symtoms and cure of this complication. Diseases are described singly & their complications remain unnoticed.

4th, By observing Nature in preference to Books we avoid the acquisition of false Theories a fruitful source of Error in medicine. I think Dr. Cullen justifiable in aſserting that "you will find ten false facts for one false theory in medicine.—

5th You will avoid deception from the propensity which Authors poſseſs of relating marvelous symtoms and facts of different kinds. The authors seldom describe a new appearance in a disease without some exageration.—

6th By early habits of visiting the sick, you will conquer the reluctance with which sick rooms inspire young minds, & subdue the feelings which

often obtrude on the mind at a time when exclusive consideration of the patients case is necessary.

7th The impressions which diseases make on our minds are more durable than the most accurate description either in a Lecture or in a book. In a word, I would as readily believe a man could learn to swim by reading a treatise on Swimming without entering the water, as that he could learn to cure diseases without attending to the Symtoms and various circumstances connected with them. —

To render my observations on visiting the the sick as proffitable as I can, I shall next proceed to make some remarks on the proper methods of conducting yourselves in your attendance on the Sick.

1st Visit your patients at least once every a day in acute or dangerous cases: In some cases the neglect of this has made the further visits of physicians useless, even where no immediate necessity appeared for doing this.

2d Visit them at the same hour every day; by observing this you never surprise them, either on their close Stool chair, or in any situation which would render your visits unpleasant — again, your coming will not surprise or disappoint them, you catch him as it were at the

moment of hope, and a few words of encouragement droped from a Physician, has often more effect than the most powerful Cordial: Hope has a singular influence on Sick people:— Once I Knew a Lady Kept awake a whole night by the physicians disapponiting her in coming at the appoint hour:— hope should be instilled into the minds of your patients; believe me Gentlemen, it is of more consequence, in some states of the System than all the Cordials in the Universe.

3d Have your medicines administered as soon as possible after they are prescribed, the interval is unpleasant:— have your Medicines put up with care and taste.

4th Write your directions in a le~~x~~gible hand; all men cannot write an elegant, but there are very few who cannot write a legible hand. Numerous and fatal are the consequences of neglecting this. I have Known a Physician write a prescription in which he intended a Solution made in Aqua Fontana, he wrote it Aq. Font. but so badly as to be deciphered Aqua Fortis:— the Apothecary used the Nitric Acid, the patient took it and died.—— Another wrote Vinum Antimoniale so as to be mistaken for Vitrium Antimonii, the consequence here was.

was also fatal. —

Under this head I may also caution you against seeing your patients to early in the morning, as too late at night; the propriety of this caution must be obvious to every delicate mind.

I hope my ninth observation may not be so applicable to any one present as to induce him to think it levelled at him. — I must reprove the contempt in which some young Physicians hold the office of an apothecary; — as well might a man expect to be a General without previously being a Soldier, as to be a physician without being an Apothecary. The names of Cullen, Fothergill, Wattson & . . . . . might be sufficient to reprove this foolish pride: all these Gentlemen rose to eminence in their profession & all these Gentlemen were Apothecaries boys, and served their times out in Apothecaries Shops; besides, those patients who are in most need of are those from whom we derive the most profit, hence we find Starving physicians in the neighbourhood of rich Apothecaries. In Chronic Complaints a good Nurse & good Apothecary are more liberally rewarded and in fact more really useful than Physician; permit me therefore Gentlemen to recommend a strict attention to this caution, to be your own Apothecaries.

5th Never neglect common complaints for uncommon ones.— While the celebrated Dr. Hamilton was attending the practice of a hospital in Edinburgh, a patient was admitted with two heads, the Students in general were attentively examining the phenomenon: Hamilton alone was feeling the pulse of a patient in common Intermittent fever, being asked why he neglected the opportunity of examining so curious a deviation from nature, he replied. he should probably never again meet with the like circumstance, but fevers he would see perhaps every day of his life, and they were consequently of more importance to him than all the Monsters in the Universe:— In like manner, you had better be well instructed in the cure of fever than that of Cancer, or Aneurism, or other rare diseases. It would be a matter of comparitively small importance if all our patients with cancer were to die if we could succeed in curing all the fevers which daily present themselves to our notice; we meet 10,000 fevers where we meet one Aneurism.

6th Set up with your patients at night especially if they are critically situated. Many circumstances of their complaints can be observed by this method which we should otherwise remain

unacquainted with: the position of the patient when lying in bed; his heat or coldness (in the extremeties) &c. his respiration and perspiration may, although apparently trifling circumstances, give us useful hints with respect to his case. The late King of Prussia had taken a young Nobleman under his care to instruct in the art of War, he caused him to sit up whole nights or frequently called up in the course of the night in order to inure him to hardships.– If then so much care was bestowed in the instruction of a person in the art of taking away life, with how much cheerfulness ought we to practice it in cases where we can restore or preserve life? By pursuing this mode of conduct we are able in critical cases to perform the Venesections as frequently or as sparingly or as copiously as we please, or exhibit Wine &c. at the most proper time. I once knew a Physician get in handsome practice by curing a patient of an Intermittent sitting up with him at night, by doing this he was able during the remission of the fit to pour in the bark plentifully and cure his patient.

7th.. Never cease visiting your patients

till they are perfectly cured; patients are too apt to think themselves well before they really are so: The advice of a Physician is necessary to Convalescents in several things Diet, dress, exercise &c. apparently trifling — should now be attended to. Relapses succeed fevers sufficiently often from those causes which we cannot foresee or prevent; such accidents do now and then occur, but the neglect of a Physician is too often the — shameful cause of them.

8th. Let no avocations whatever of business or pleasure prevent your attendance on your patients: When a Physician undertakes the care of a Patient he enters into a contract with that patient, the subject of this contract is the life of that patient, the Physicians time is mortgaged to the patient and it is unjust to deprive him — of his share of it.

9th. In every part of your attendance on your patient endeavour to inspire them with hope and confidence in your prescriptions.

10th. I hope I need not mention the delicacy with which every practitioner should treat the complaints of females whatever may be their rank in life. I have never

known a young practitioner succeed who was negligent of the complaints of his female patients, or who treated them with indelicacy. The above precautions are more especially necessary in persons of respectable rank in life; but they should be observed in all private practice. The forms of visiting Hospital patients I shall illustrate during my attendance on the Hospital the ensuing winter. Practice in Hospitals is attended with many conveniencies & inconveniencies: The conveniencies of Hospital practice are, that medicines are administered with more accuracy than in private practice: the diet and exercise of our patients are regulated according to our desire, and in general our government over our patients is more perfect than in private practice: But these advantages donot compensate for the inconveniencies attendant on Hospital practice. These are, 1st The patients are in general such as from their modes of life are much debilitated, and their constitutions by strong drink and other causes are broken down.

2d. Patients seldom apply for relief to hospitals except in cases where their cures ~~where~~ ~~their~~ have been unsuccessfully attempted.

Lastly, the bad air, confinement to one room, and not sufficient cleanlineſs are great objections to hospital practice. Those who have an opportunity should attend to both public and private practice: here again we see the utility of keeping our own-medicines, our pupils could not else see our patients. —

Clinical Lectures are of great service in the Study of Medicine, they were first introduced by Rutherford in the hospital in Edinburgh. The University of Vienna owes much of its reputation to the establishment of Clinical Lectures. De Haen, Stork & Stahl aſsisted in promoting the Study of Medicine in Vienna in this way. I shall make observations during the winter on such cases as shall occur in our hospital either there or from this Chair. —

I next proceed Gentlemen to notice the forms to be observed in visiting our patients. — In the first place the utmost respect is to be manifested, and no concern of our own as I before observed prevent our attendance on the Sick. As soon as we enter a patients house if our Religion does not prohibit we should pull off our hats; the

the master of the house we should consider as present in every part of it; if his servant appears we are to recollect he is the representative of his master and is to be treated with respect. —

2d. If a Lady conduct you up stairs always precede her, the reason of this advice must be obvious to every one of you, in coming down stairs walk behind her. When you approach the Chamber of your patient give notice by a cough or a hem, or by some other method, or if you can conveniently, send word of your arrival it is best to be done; — always knock at the Chamber door: here I must repeat the good effects of visiting your patients at a particular hour, you catch him as it were at the moment of hope, and a disappointment is to him a serious misfortune.

3d. In consultations the consultor should go first into his patients room, even if he be the younger man; the consulted physician should never feel the pulse of the patient till the other has in the presence of the patient mentioned the remedies which have been used and a short account of the symptoms; Reason and Justice concur

concur in demanding this. — If the first — Physician were to go a minute or two before the consulted one it would be better. — The consult Physician should not even answer a question without asking the consultor, and the patient should hear the prescriptions. —

5th. Whenever you enter your patients chamber sitdown on a chair or trunk & if there be none in the room on the bed side of your patient, it shews recollection, pull off your gloves, and if winter your great coat should be laid aside, & if wet must not be in your patients room; never feel the pulse of your patient as soon as you enter his room. Dr. Fothergill relates an instance of a Physician being discarded for feeling the pulse of his patient with his gloves on. Be careful to avoid entering into conversation with your patient before you feel his pulse, conversation has a great influence on the pulse; when you have done this the history of the case had better be enquired from the patient himself, he is certainly the best — judge of his disease, tho, probably the worst of its cause, his friends must inform you of this last.

The following are the questions necessary to be asked; how long have you been indisposed? how, when, & where were you first seized? what time of the day? & what were you doing when taken? at home or abroad? walking sitting &c. Your next query should be about the remote cause of his disease; the patient as I just observed is seldom the proper person to interrogate; his friends his acquaintances, and sometimes his enemies should, he will seldom confess that intemperance is the cause even if it should be.

4th Your next questions may be more general as the mode of living, drink exercise clothing of your patient, also his business — pleasures, whether he has been exposed to cold, and many other of the like queries, not only with respect to the day on which he was taken but for several days previous to the disease: — heat and cold are very common causes of disease; Sydenham observed this long ago and with great reason. enquire whether your patient has ever been affected in like manner before, if not what diseases he has been subject to, — Also for his mode of life: for a long

while before: the gout of 40 is often the consequence of intemperance at 20 - & blindness at 50 of accidents at 30. I once knew a gentleman who was affected with seminal weakness in his old age, who acknowledged it was brot on by the detestable vice of Onanism, the practice which he acquired while a boy at boarding school Instances have been known of diseases of the brain brot. on many years after strokes on the scull. A gentleman had a violent pain over his right eye brought on by his schoolmaster having lifted him up by his hair in school.

5th. Had you ever the same disease before, if so what was the cause and how were you cured? Where were you when sick, did it alternate with any other disease? - Consumption has been known to alternate with Rheumatism; you had better excite the latter as it is a safer disease than phthesis. had you ever a cutaneous disease or Sores? if so did they sudenly disappear? this has been frequently the source of disease, which may be cured perhaps by again exciting the skin disease ~

6th. Never be deceived in the symptoms

of the disease by the medicines your patient has taken; — has your patient a diarrhoea, ask him if he has used any medicines to purge himself. — black Stools, a very alarming symptom of disease, is frequently produced by the use of Steel: — Itching of the Skin and Sickness of the Stomach is frequently the effect of Opium; Dizziness too has been the effect of this medicine —

7th. The age of your patient must be known, particular ages have their particular predispositions to disease: more especially they must be sought after in females; the Catamenia should never be lost sight of in female complaints; from 14 to 15 years of age is the time of its commencement, this continues from 45 to 50. — The peculiar predispositions of the natives of different countries are to be sought after: — Thus Dr. Hillary informs us that the Intermittents of the Negroes &c in Barbadoes terminates in Swelled legs: a Molatto girl from that Island whom I cured of that disease had a Swelled leg in consequence. —

Enquire also the diseases of the patients Ancestors, many diseases are hereditary, and such are more difficultly cured; the most

common of these are Mania, Gout and Consumption; the prognosis in these diseases you know is not flattering. —

Enquire if there are any particular family Medicines which have been much used in these complaints of your patients; these are common and should be tried before any others. —

Enquire the diet of your patient, — intemperance in this as in drinking can only be learned by enquiring of the friends of the sick, or by eating occasionally with them. — I once detected the cause of a violent bowel complaint in a lady in this city by dining with her, I observed that she eat an immence quantity of pepper and Mustard, and that all her food was very — high seasoned. The vinegar which ladies eat when young (in pickles) to keep them from growing too corpulent has been known to produce very unpleasant consequences in their more advanced years. The late King of Prussia perhaps the greatest glutton that ever existed, who ate almost without cessation used to say that he eat scarcely enough to keep soul and body together. —

But Gentlemen, I must again —

repeat the necessity there is in all female complaints, of attending to the Utterus; as in Infants, I would never lose sight of Teething and worms, so in Gluttons and people in high life I would not lose sight of the Gout, and in ladies I would not lose sight of the Utterus. These I consider the preliminary observations. I next proceed to treat of the questions to be asked concerning real disease, but this must be the subject of our next lecture.

Lecture 3d

At our last lecture we observed the principle causes of predispositions to diseases, together with the proximate and exciting causes: I next — proceed to treat of the nature of diseases themselves. 1st The first question you should ask your patient whether he has pain, and where the pain is seated, whether in his bones, head, breast &c. the head is the most dangerous part for pain to exist in; it is not dangerous in the bones: Our indications of cure are to be varied according to the nature and seat of the pain. Enquire concerning the appetite for food drink &c. the farther these vary from health the more danger is to be apprehended; an increased thirst attends on fevers in most cases, if it be exceſsive the patient is very ill: Enquire concerning the alimentary canal, urinary organs &c. much is to be learned from the state of these; Costiveneſs is always a bad symptom, also the obstruction of the secretion of urine; the colour of the urine is also a matter of some consideration, high coloured urine occurs in fevers. The sleep of our patient should also be taken notice of,

also the state of the mind, both in acute or chronic diseases: Observe also the Cubitus of your patient, that is, his position in bed, whether natural or not, this is of consequence both in acute and chronic diseases, if he lie constantly on one side some viscus, most probably his liver is affected; it is the most favourable when the patient can lie with equal ease on both sides: Observe also his respiration asleep aswell as awake.—

2d. The Countenance of your patient will throw light on the nature of his complaint; many diseases appear evidently in the face of the sick, the Yellow Fever in a remarkable degree; violent fevers are generally accompanied with a flushed countenance; a gloom is observable about the forehead in Consumption; In the Stone a melancholy Countenance is remarkable, and according to Dr. Letsome the Hydrocephalus Internus may be known by the Countenance. Mania is almost always evident in the face. When you enter your patients room at night, then be sure to have a light in the room that you patients countenance, observe his Eyes whether red or not.—

Some people have supposed the natural colour of the Eyes capable of giving information with respect to the disease, thus black eyed people are supposed to be subject to sore throat and Consumption; The pupil of the Eye is dilated in affections of the brain. Black Eyes certainly indicate an irritable habit, and irritable people may be more subject to sore throat. Examine also the colour of his hair, Red hair is supposed liable to Consumption: Attend also to the Teeth; Dr. Mead says that good teeth indicate a disposition to Consumption; I think it to be a fact that can be explained from the patients eating toomuch. I have often observed bad health to be the effect of bad teeth, as imperfect mastication of food causes indigestion and produces Stomach and bowel complaints. – Dry Skin occurs in fevers, indications are to be drawn from the quantity of perspiration, Mador and Sudor. Voice, this is of consequence to be observed, a Squeaking voice indicates an affection of the trachea, or Cynanche Trachealis &c. hoarseneſs is always a bad symtom; any deviation in the voice is dangerous, and the further is the deviation the greater is the danger.

Next the tongue should be considered ^noticed^, this is dry in inflamatory fevers, in malignant fevers black; a yellow white furred appearance is common in fevers; in Typhus too the tongue is generally dry; but Gentlemen, you must be on your guard, be not deceived by any Medicine or food which your patient may have taken which often — changes the appearance of the Tongue. Port Wine and Clarret colour the Tongue black; Tobacco, Currant jelly, liquorice &c. have the same effect; tobacco has often deceived me in this way: A black tongue almost always indicates the approach of Death (when a real consequence of disease), Red is more favourable; quite yellow frequently occurs in malignant and yellow fever; in general the more unnatural the tongue is, the more dangerous; but a perfectly natural tongue in malignant fevers is one of the worst symptoms with which I am acquainted. Never leave a sick room without naming the disease.

These, Gentlemen, are the principle circumstances concerning which you need to enquire; most physicians have been remarkable for some one of them; some have

depended on the Skin, some on the tongue, some on the Urine; but I hope my pupils will be distinguished by their Knowledge of, and attachment to the pulse: There is as much difference between the Knowledge derived from it, and the symptoms, as between Speech and inarticulate Sounds: tho, as I have just mentioned, many useful truths may be learned from other parts of the body, & I would have them neglect none. The pulse indicates much in almost every disease; tho, I acknowledge, it is deficient in some cases.—

I shall divide my account of the pulse into three parts: In the first I shall consider it in its natural or healthy State, in the Second, in its morbid State as it occurs in diseases; and lastly I shall conclude with the mode of acquiring a Knowledge of the System from the State of the pulse.—

I. Of the pulse in its natural State.

The pulse of a healthy adult in this country is between 60 and 80 strokes in a minute, the medium about 66.—

Many circumstances influence the frequency of the pulse, and 1st Age.—

The pulse of a newborn Infant beats from 120 to 140 strokes in a minute; from birth to one year old it varies from 108 to 120; in the second year from 90 to 120. In the third year from 80 to 118; 4th, 5th and 6th years — from 80 to 108; beyond the 6th and below the — 12th years it varies from 90 to 72, after the 12th year it suffers little change and is nearly the same as in adults Viz. from 60 to 80: As persons grow old the frequency continues to diminish some what; but the most singular circumstance in the pulse of an old man is its irregularity, it is slow, intermitting, full, and sometimes even tense; in many it beats about 40 strokes in a minute, in some not more than 30, and in an old person in this city it is about 26; indeed old people never have regular pulse unless they are diseased.

2d. *Sex* influences the frequency of the pulse, it being more frequent in females than in males.

3d. *States* of *Society*, or Civilization, it is much more frequent in civilized people than in Savages, Savages want the manners and Stimuli of conversation &c. Which

§ Mr. Hawkins observed in many Indians the pulse to be as low as 40.

civilized people enjoy; hence also country-men have leſs frequent pulse than Citizens; they want the same stimuli or have it in a leſs degree than Citizens: Of 10 Indians whose pulses I examined in this City 8 had pulses at 60,^{8} the other two were quicker; but one of them had been siting by the fire, and the other I afterwards learned was the son of a Frenchman by an Indian mother. State of society has so strong an influence on the pulse that I think it would be possible to distinguish the natives of different countries by the pulse. —

4th. Size influences the frequency of the pulse; it is quicker in short than in tall men; the pulse in very tall men is 50. —

5th Different Trades, Profeſsions & Occupations exert an influence on the pulse, and I think in proportion to the stimuli neceſsarily attendant on each of them. I think we might almost tell a mans trade by feeling his pulse. —

6th. Climate, — In cold climates the pulse is much slower than in the warm ones, thus in Greenland the pulse is about 40. Different Seasons

✕ Haller says that there is difference of 15 strokes a minute; where pulse is 65 in the morning, shall be 80 at night.

of the year alter the frequency of the pulse being most frequent in the summer. ⁓

7th. Different times of the Day; the pulse is slowest early in the morning, — quicker after dinner, and at bedtime ~~again~~ ~~it~~ again it is generally slow; but various circumstances in the course of the day alter the regularity in these changes of the pulse. ⁑

8th. The pulse differs in frequency in the sleeping and waking states; it is 8 or 10 strokes slower in sleep. This may be called a Nosometer, or compared to the Dial plate of a watch or Clock. ⁓

In order to acquire an accurate knowledge of the pulse in its diseased state it is necessary we should be acquainted with it in its ~~diseased state~~ healthy state, and also in the different stages of life. In the healthy pulse it is full, round, soft, & flowing; this state differs under different circumstances. 1st. It varies according to the age of the person; at the commencement of life or a few days or week after birth the pulse varies between 130 and 140 in a minute; towards the end of the first year 124; at two years of age from 108 to 110; at 3 years from 90 to 108; at 4

4 — 5 or 6 years of age from 80 to 100; at 7 it falls from 90 to 72; in adults it is from 60 to 80 in a minute: In old age it is slow and intermitting; this is so much the case that where it differs from it, it shows signs of disease; at the age of 60 the pulse beats 60. ⟶

2d. Sex influences the pulse in its quickness, that of females being more frequent than that of males. ⟶

3d. Different States of Society or civilization influences the pulse; it is slower in savages than those brot. up in civilized life; I have felt the pulses of . . Indians and found it below 60 in 3 of them, 2 others reached that number; but one of them had been sitting by a fire, and the other was the offspring of a Frenchman. All those who spend their time in idleness have slower pulses than those who are busily employed. ⟶

4th. The sizes of people affect the arterial system, its pulsations being quicker in the short or slower in the tall.

5th. Climate and different seasons of the year affect the pulse, being quicker in warm than cold climates; in Greenland

#By bed clothes; always feel a patients pulse when the arm is in the most natural State and freest from preſsure of all kind.

it scarcely exceeds 40: In the West Indies it is quicker in newcomers than in old inhabitants; in newly imported slaves it is quicker than in those we have had for some time amongst us. —

6th Different times of the day influences the pulse; it is slower in the morning than at noon, when it is the highest, and then gradually descends till evening. —

7th Different in sleeping and waking states, quicker in the latter. —

8th Different positions of the body influence the frequency of the pulse, thus, it is slower when on the back ~~and~~ quicker when on the sides, quicker still when sitting up, and quicker when in an erect posture.

9th Fasting and food and drinks especially such as are stimulating, quicken the pulse.

10th Different positions of the arm influences the pulse; when the arm has been exposed to the cold some time the pulse becomes much slower, and also when the arm is much pressed* under the body & when its muscles are in action, hence the propriety of warming the arm and relaxing the muscles when we feel the pulse. —

§ You should never commence conversation with your patient till you have felt his pulse

§ Especially at the usual time of menstruation.

* Hence in Pulmonary Consumption we should not examine the pulse immediately after a severe fit of coughing.

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11th *Exercise* of the *Understanding* and the *passions* of the *mind*; those of a Sedative lowering, and vice versa anger &c. quickens it to 140. —

12th *Conversation* quickens it, hence the propriety of feeling the pulse before the patient begins to describe his feelings.‡

13th Bodily *Exercise* quickens it; if the natural state of the pulse be 64 when sitting, standing will increase it to 68, walking at the rate of ‡2 miles an hour 78, 4 miles 86, and running, from 140 to 150 in the minute, if he runs smartly. —

14th *Pregnancy* quickens it; quicker also when the Menses flow, and during menstruation: it is of consequence to know this in Chronic cases of disease. — All pregnant women have their pulse preternaturally quick‡ or slow. —

15th *Certain Medicines* quicken ~~the~~ the pulse, such as Opium, Vomits, Purges, Bark, Blisters, Steel, hot & cold Bath &c. —

16th *Coughing* quickens it.* —

17th *Fear* influences it, hence in visiting a patient we should wait a few minutes in order to let him get over the agitation produced by our presence; I

‡ Hence a physician should completely make up his mind before he prescribes bloodletting.

‡ As we may perceive when intent on feeling our own pulse

I have seen the pulse fall after prescribing Vene Section.&

18th Intensity of thought influencing Respiration, lessens the pulse.&

Besides the above ~~three~~ causes there are many others less readily explained which either increase or diminish the frequency of the pulse. The situation of the Artery at the Wrist (which is the best in the body for feeling the pulse) varies often; it is situated sometimes near the thumb, this you must be aware of: We ought by rights to know the natural pulse of our patients, for scarce two people have them alike even in health.

There are some deviations from the general Rule of the pulse, for example, there is a Gentleman in this City (Judge Peters) whose pulse is 100 in a minute when in good health; and a Lady whose pulse does not exceed 40 in a minute.

II. Before entering on the Morbid States of the pulse I deem it necessary to deliver a few Physiological propositions.

1st. The Heart and Arteries are connected and possess great irritability; hence

§ Which, when any part is touched drops all its leaves into tender sympathy if one part be affected the whole will sympathise; they may be compared to the sensative plant§, or to the Bells of the Jewish High Priests, touch one and all will ring.

2d. The Heart is muscular fibre possessing irratability. . . . .

. . . .

3d. The same motions excited in one part of the arterial System are communicated to others; this is illustrated by the case of Hicks who died in this city with an enlarged Omentum, which pressed upon the Aorta and affected the whole arterial — System: Is the pulse tense in acute — Pneumony? the same occurs in the whole arterial System, as in the pleura or membrane of the Lungs. Are the vessels of the lungs engorged in Pneumonia Notha? the same occurs in the whole Arterial System.

There are diseases in which the pulse does not sympathise, but these are few, and many arise from the following causes, 1st from a want of irritability:— 2d from suffocated excitement:— 3d from the disordered State of the artery at the - - - - . . . . . 4th from large portions of fat pressing upon the pulse

5th from an accidental pressure of the muscles. 6th from cold. 7th from want of irritability in the contiguous surrounding parts. 8th from want of sympathy in the Heart. 9th from an unequal excitement in the bloodvessels as in the atonic fever, ... Palsy & Gout.

Let not the number of these exceptions preclude the feeling the pulse, for they do not occur in more than one case in twenty. We see sometimes the absence of pain in malignant fevers where the tongue is foul &c. and vice versa in diseases of less consequence. —

Thus I have mentioned the different states of the pulse as they occur naturally in the different states of ~~natural~~ perfect life: But as physicians it becomes us to go farther & acquire a Knowledge of this important part of the human frame as it varies in consequence of the numerous incidents and diseases to which it is subject Viz.

The Morbid States of the Pulse;

These are Known 1st by their frequency and quickness: These are not necessarily connected for the pulse may be very quick and yet not frequent, as in the Yellow Fever and

in the last stage of other fevers: In the Apoplexy it sometimes falls as low as 7; this slowness originates from the pressure, as in Apoplexy and Palsy, the pulsation being equal to each other, but intermissions occur in - Malignant fever &c.

2d By their *force* and *regularity* also ...... a jerking sensation to the fingers resembling a shattered quill. —

The different states of the pulse as occurs in *fevers*.

1st The *depressed pulse*; this often descends as low as 46, 30, 25; and sometimes so depressed as to be almost imperceptible; it is raised by V. S. It is sometimes *preternaturally frequent* or *slow*, - attended with Intermissions and sometimes [illegible] Natural; it occurs in Plague, Yellow-fever, Malignant Small Pox and in Pleurisy. it is either partial or general; occurring in the extremities in the former, and in the latter occasioned by Stimuli depressing the strength below the healthy state; it resembles the weak or Typhus pulse: The following directions will serve to distinguish it. 1st The depressed pulse is known by its occurring in the

in the begining or *forming* State of fever, or in the Paroxysm of such fevers and other diseases as are periodical. 2d By imparting a sense of tension to the fingers when long and attentively felt. 3d By occuring in Morbid affections of the Brain, Heart, Stomach and Bowels more frequently than in diseases of other parts of the body. 4th By its being raised by V. S. purges &c. taking off the suffocated excitement. 5th By its being attended frequently with slowness or intermissions. This pulse may be compared to a tree bent by the wind, and rising to its pristine state after the storm has blown over; while the Typhus resembles a tree shattered by Lightening, or which cannot be raised but by the hand of Art.

II. The *Catgut* or Sulky, or Locked Pulse is small tense, quick and distinct; imparts a sensation to the fingers similar to that produced by feeling a tense piece of "Catgut", from which I have named it: Occurs in Malignant fever.

III. *The Synochus.* A full, round, vigorous, frequent & quick pulse without hardness which occurs in the highest grade of Bilious fevers, in affections of the Brain &c. Exercise produces a pulse somewhat

Similar to this.

IV. The Synocha, or common Inflamatory pulse, being full quick, frequent & tense, but not round, and is known by heat thirst &c. occurs in common Inflamation. This pulse exists sometimes in the Plague, yellow fever jail fever, Small Pox, but more frequently in Pneumonic affections, Rheumatism and Arthritis.

V. Synocula, a quick, frequent moderately tense, but small pulse, imparting a sensation to the fingers similar to a small quill, and occurs in Chronic Rheumatism Gout Phthisis Pulmonalis &c. and in the second stage of other fevers.

VI. The Synochoid. or a soft and hard pulse, feels like a shattered quill, and is a compound of Synochus and Synocha; it occurs in the passage of fevers from the Inflamatory to the low state, feels like a quill that has been troden upon.

VII. The Typhoid. or a frequent and less tense than full pulse. This is composed of Synocha and the low Chronic state of fevers and occurs in the Hectic & Puerperal fevers and in the Scarlatina &c.

VIII. The Typhus, or a weak —

frequent, but not full or tense pulse; this occurs in the low Chronic State of fevers, or in some malignant fevers; also in the close of inflamatory diseases when depleting remedies have not been used in the first Stage. The bloodvessels in this appear to be deprived of part of their irritability: it is here that bloodletting is forbidden and Stimulants are to be used.

IX. The Hectic Pulse. The forms of this pulse are various, being occasionally — Synochoid, Typhoid and Typhus; it occurs in Pulmonalis, Podagra, & Tabes from Lues venerea and Scrophula.

X. The Hobbling Pulse, or unequal and fluctuating, is tense quick and very frequent, and may be divided into 2; — 1st. one, two. three succeeding a slow one; 2d. one, two or the slow succeeding a quick one.

XI. The Dicrotus or Capifrisous Pulse, the former strongest; in this pulse there are often intervals two strong strokes

XII. The Serrated Pulse; strikes the fingers like a saw

XIII. The Vermicular Pulse, small frequent and resembling the motions of a worm

XIV. The Creeping Pulse, weak

weak small; occurs in the close of life.

XV. The apparently Natural Pulse occurs in the most Malignant fevers; great danger is to be apprehended from this. difficulty to be understood from health. There scarcely ever are any one of these always present, they are therefore combined; — 1st in double proportion as full and weak; full and quick; quick and frequent; depressed and weak; Slow & Intermitting &c. 2d. In a three fold ratio, as full strong & frequent &c. and Small weak and Slow at the same time. 3d. In a four fold ratio, as full strong — quick and frequent at the same time.

XVI. A Full Bounding Slow and moderately Tense Pulse; which occurs in Palsy, Dropsy &c. it is especially slow in the affected side in Hemiplegia. I examined the pulse of a paralytic patient, whose artery beat on the affected side only 50 in a minute, while on the other side beat from 80 to 90.

XVII. A Weak Low Pulse without Irregularity & without force &c. is distinguished from the weak Slow pulse of Malignant fevers by its occuring in the last stages of disease.

§ The creeping pulse is the dying pulse, or the pulse of a dying Person.

XVIII. The Aneurismatic Pulse.

is full tense and Jarring; if you once feel this pulse you will never forget it; it gives the fingers a disagreeable jarr wh. will be remembered a long time &c. —

In order to inform your patients of the State of the pulse, which sometimes they are extremely anxious to know, you should compare it to a Scale ~~with~~ of 10 degrees, with 5 above and below the healthy point. —

{Another Manuscript says Dr. Rush divides the pulse into 10 Grades 5 above and 5 below 0. The Typhoid is one above & Typhus one below 0. The Creeping pulse is fixed at 5 below 0.} In disease of the bowels the pulse is generally small or Typhoid; but disease being an Unit, it is an unnecessary knowledge to know precisely the seat of the disease. —

XIX. The Gaseous Pulse:

Soft full and round, but sinking under the fingers; even the pressure of the little finger produces this effect.

The pulse is very much influenced by the Strength of the body: In the

Ram the pulse has been found to beat 65; in ~~the~~ an Ox, from 36 to 38; and, in a Horse from 34 to 36 Strokes in a minute. —

There is sometimes an absence of pulse for 2 or 3 days; and I have heard of an absence of it for 7 days.

Here follows another Manuscript of the Pulse

II The alterations made on the pulse by Disease: These are 1st in frequency and Quickness: By frequency is meant the number of strokes in a given time Viz. a Minute. By Quickness the time in which each stroke is performed. The pulse varies from health in quickness and fullness, as in the first Stages of Yellow Fever, & other acute diseases: — here it varies from 60 and 80, to 100, and even 200; and falls in some diseases to 40 – 30, – 20 –; and in one or two cases to 9; — and I have even known a case of Apoplexy in which the pulse fell to 7 strokes in a Minute. The Quickness is probably caused by an

irritable State of the bloodveſsels; they contract more quickly by the Stimulus of the blood (the arteries especially) this irritability I conceive to be induced by the Stimulus of Miasmata; hence it occurs in Intermittents, Yellow fever &c. This circumstance in some cases gives rise to the intermittent pulse: - This is where there is a ceſsation of pulsation for a certain time, after every 1st, 2d or 3d Strokes, and frequently occurs in Malignant fevers.

2d The pulse varies from health in *regularity* and *force*; this is of more consequence than variations in frequency and quickneſs & fullneſs. In some cases the Idea received from feeling the pulse resembles that by feeling a Shattered quill. –

I shall proceed to notice the different States of the pulse as they occur in *disease*

1st *Synochus*: This pulse is full frequent, quick and not hard; it occurs in almost every Bilious fever; in the first Stage of Yellow fever where the System has not been debilitated by bleeding. —

2d. Synocha. A full, quick, frequent & tense pulse, such as occurs very often in Yellow fever, and also in the Gout. —

3d. Synocula. A quick, frequent & tense, tho' a small pulse: I have denominated it Synocula, a diminutive of Synocha; it differs from the latter in the volume of the artery: it often occurs in remitting fevers. —

4th. The Typhus pulse; this is frequent and quick without tension, is weak; it occurs principally in chronic fevers. especially of the — Nervous Kind. —

5th. Typhoid. This is a little fuller and more tense than the Typhus.

6th. Synochoid. This pulse is between the Typhoid and Synocha, or rather Synocula; it occurs in the passage of the Slow into the low states of chronic fever. —

7th. The Locked pulse: Pulse resembling that of an old person, only in general rather quicker; it beats 30 or 40 strokes in a minute: it occurs

only in highly malignant fevers, as Plague, Yellow fever &c. it is common in Jamaica, produced I believe by the action of Miasmata; It is resembled by the pulse of an old Man, 2d by a pulse reduced by bleeding; & 3d by the pulse which occurs in inflammation of the Stomach & Bowels; tho' it is tense and more chorded than the last.

8th Cat Gut or Chorded pulse

This pulse is small, quick and frequent; strikes the fingers forceably so as to convey the Idea of resentment: I have called it the Sulkey pulse. It occurs in violent cases of Malignant & Yellow fever.

9th Hectic Pulse. is quick & frequent, often full, partakes of Typhoid and Synochoid, occurs in Chronic fever and Phthisis Pulmonalis, from which it can only be distinguised by a knowledge of the history of the disease; it occurs also in gout, waste of body, atrophy and the like.

Lastly Gentlemen there is on our list of Morbid pulses, the Natural or healthy. A pulse quite natural in

violent fevers is one of the worst symptoms I know: it occurs in most malignant yellow fevers: It can only be distinguished from a good pulse by other symptoms of the disease. I have in another place remarked that there are three Naturals which are bad symptoms; They are, a Natural pulse, Natural Skin & a Natural Tongue. I shall mention this pulse more particular when I speak of the prognosis of fevers in which it occurs.

Authors make many more states of the Pulse, but I believe they are all included in those which I have mentioned; unless indeed it be the Oscillatory, Undulatory, or Vermicular pulse; this cant be well described; it consists in a succession of pulsations one rising above another like the waves of the Sea. There is also the Dicrotus or Insidious pulse; or as I have called it, the Hobbling pulse. These Gentlemen, are of no consequence; the force of the pulse is of infinitely more consequence. The last occurs in Palsys and dropsies of long standing. Two

Two kinds of pulse are common in Dropsies; the 1st is a full and small contracted pulse, which occurs in the begining of these. 2d. A weak low pulse after all morbid action has subsided & Debility remains;—in the first bleeding should be used.

The Strength of Animals has influence on the pulse; thus in a Pigeon it is 100; in a Dog 80; in a Ram 65; in an Ox 38; and in a Horse 34 Strokes in a minute.

Before we conclude I shall mention a pulse which occurs in Aneurisms; if you once feel this pulse you will never forget it; it gives the fingers a disagreeable jar which will be remembered a long time. Under the head of Aneurismatic pulse too, I may mention an absence of pulse; a total absence of the pulse occurs in violent affections of the Stomach and bowels, it lasts for hours: One Lady I have known continue without pulse for 36 hours in consequence of eating some Oysters; this Lady has since recovered and been quite well for many years.

The Sportsmen say the first sight at the mark is the best, so the first impressions the pulse makes is the best. An advantage will arise in feeling the pulse, by immersing the hands in warm water to increase the sensibility of the organs of touch previous to feeling the pulse.

III. I shall now give you some directions for acquiring a knowledge of the State of the Pulse.

1st Never feel the Pulse of your Patient the moment you enter the Room, your presence excites hope, fear, or some emotion in his mind, which has an influence on the pulse. If the weather be cold warm your hands and feet first. but beware of entering into any conversation with him before you feel his pulse, as the influence of conversation is very great on the pulse.

2d. Place your whole four fingers on the artery; this gives you a much better opportunity of judging than one finger could do.

3d If you feel your patients left arm, use your right hand & vice versa.

4th Feel the pulse of both arms, as there is in many cases a difference in the two from several circumstances, as exposure of one arm to cold air, pressure of bedclothes &c. on the artery: I have corrected my judgement frequently in this manner; from one arm I had prescribed bleeding, from feeling the other, retracted my opinion. —

5th Never remove your hand till you have felt 20 strokes; I have observed an intermission on the 18 stroke. The Chinese Physicians feel 49, and hence perhaps, their accuracy in the pulse. If the case be critical, shut your Eyes; order silence in the room, and, to use an expression of Dr Darwin's, concentrate all the sensorial powers in your finger ends. The influence of sound &c. detracts from the accuracy of feeling. If the radial artery be from any cause not easily felt, feel the Temporal, which is next best. Here Gentlemen, excuse my making mention of a caution in the application of Blisters; never apply them so as to

prevent your feeling the pulse; if you do feel it afterwards, you give the patient so much pain as to make an alteration in the pulse — the temporal artery must be felt; and this artery you should feel in diseases of the Brain.

6th Always feel the pulse before you prescribe any of the following remedies Viz. Vomits, Purges, Bloodletting the hot and cold baths, Pediluvium; also before the use of stimulating Medicines, as Bark, Wine, Stimulating and nourishing aliment & drink &c.

Thus Gentlemen, I have related all the knowledge I have acquired of the Pulse during my reading and practice; they are the experience of my life, they direct when bleeding is indicated, and in what quantity &c. — Be cautious about feeling the pulse after the use of Medicines, as Opium &c, and after stimulating drinks, as they change the pulse very much. The frequency of the pulse, tho' of little consequence comparatively with the force and other characteristics of it,

has been much relied on by the Physicians of Europe, especially of Great Britain; they use for the purpose of acquiring a knowledge of its frequency Moment Watches, Quarter minute glass &c. but this is ridiculous, & I hope they will never be introduced into American practice.

A Spanish Physician by the name of Solano has made many observations on the Pulse, from some of which he asserts that a hundred and Eighty is the greatest number of strokes which the arteries can beat consistantly with the recovery of the patient. 200 in Hydrocephalus is quite common, but whether they ever recover, I know not. The observations of Dr. Cullen are opposed to those of Dr. Solano; he says Dr. Solano's observations are useless. Dr. Therry says the Spanish Physicians with all their boasted accuracy, are not well skilled in the misteries of the Pulse. —

Plato, we are told, had inscribed over the Door of his School, —

where he instructed his pupils, Let no one enter here who does not know Geometry. In like manner, were I to Dedicate a temple to Medicine, I would inscribe over the doors of every apartment Let no one enter here who does not know the Pulse.

In our next lecture we shall begin our Physiology.

Lecture 4th

Having delivered the preliminary observations on several subjects connected with our Science, I proceed to the immediate subject of this course of Lectures: These I shall divide into 4 parts, *Physiology*, - *Pathology*, - *Therapeutics*, & the *practice* of *Physic*. ―

Physiology.

The first subject to be considered under this head is, *Animal Life*. My three lectures on this subject are printed & to them I refer for my doctrine of it. In them I have endeavoured to prove that Animal Life is the *effect* of the *action* of *Stimuli* on the *Excitability* of the *System*; or, in the words of Dr Brown, that life is a forced State. I have said that life consists in 3 things, - Motion, Sensation & Thought. This combination constitutes perfect Life: But life may exist without Thought or without Sensation; - Whether Sensation can exist without Motion, I very much doubt.

Every part of the body, I have said possesses Sensibility or Irritability, or both: By the first is meant the capacity of being affected in a peculiar manner by impressions: By Irritability, or as I call it, Excitability, is meant, the power of taking on action, upon Impression. Life, I have said, is supported by the action of two classes of Stimuli, to wit, external, and internal: Among the first are included, Light, Sound, Odours, air, heat &c. The internal Stimuli are, Aliment, Whether Solid or fluid, the Chyle, Blood, a certain portion of the glands. 2d. The faculties of the mind during the Waking State and (when they act in sleep) in dreaming; the internal Stimuli support life in the State of Sleep; they then act with increased force from the abstraction of the others, for the abstraction of one of the Stimuli is always followed by the increased action of the others. I next considered how Life is supported in the Foetus in Utero, and in such as one born Deaf Dumb & blind: Also in the inhabitants of various other parts of the Globe; the influence of their situation, Diet, dress and various other circumstances. Having considered Life in all its various States, I have passed on

on to the Death of Animals. These three lectures I wish you all to read 2 or 3 times in the course of this week, and fix the principles contained in them firmly in your minds. ——

This property then of life is the first thing which strikes us on beholding a living body. The 2d. thing we observe is, its Heat. Why is an Animal body warmer than other Substances in the same Atmosphere? the consideration of this question, of the source of Animal heat will constitute the subject of our present Lecture. ——

I shall here glance at several of the Theories broached for the purpose of explaining the nature of Animal heat; & first of Dr. Stevenson, who attributed this phenomenon to a fermentation, and this too of the putrefactive kind: Several reasons concur to render this Theory inadmissible. 1st. because it cannot be proven that fermentation does take place in the blood, and the supposition is purely hypothetical. 2d. because the animal body must be dead before putrefaction can take place within its substance: In the Bile, Sweat, & Faeces, I grant that this process does go on, but these are to be considered as

as extraneous Substances. Dr. Seybert (of Philadelphia) in his Inaugural Dissertation has proven that no fermentation does or can take place in the blood; a kind of Septic process, as I first observed; goes on in the excretions. —

3d. This theory must fall because no heat is generated in putrefaction, and the putrefactive, is the only fermentation which animal matter undergoes; no heat is given out, for instance, in the putrefaction of a Whale on the Sea Shore; and again, the heat of an animal body is by no means increased by a gangrenous Diathesis. The Vinous state of fermentation is the only one which generates or evolves heat, and this cannot take place in the blood. —

4th. If Animal heat depended on putrefaction, we should find the largest Animals warmer than the small ones; for in proportion to the quantity of matter would be the evolution of it; yet this is by no means the case, an Elephant and a Mouse are of the same Temperature. —

A Second hypothesis with respect to the causes of Animal heat is, that it is owing to friction of the fluids against the

solids of the body. Probably this theory took its rise from the heat of animals being in proportion to their Circulation; but many reasons compell us also to lay this aside. 1st heat is only producd by bodies whose surfaces are unequal: you can never produce heat by agitating water in a glass vial; - it is true that Cream acquires heat by being agitated in a Churn, but this is to be explained from the decomposition which it undergoes in the disengagement of butter: The vessels being smooth, then no heat can be generated. 2d. for the production of heat by friction it is necessary that one part be fixed; a Rope acquires no heat in passing through a pulley because both are in motion; now both the blood & vessels move continually. 3d. the motion of the blood is so slow at any distance from the source of circulation, that its velosity is insufficient to explain the heat. Dr. Martin says the increased surface of the vessels is sufficient to ~~explain this~~ obviate this objection, but it certainly is not by any means.

A Third Hypothesis is, that it is owing to the motion of the different parts of the blood upon eachother: This cannot be

the case, for mercury and water might be agitated in a vial to all eternity and no heat be generated.

To Chimistry belongs the honour of having discovered the true source of Animal heat, and found a theory, in my opinion capable of explaining the phenomena connected with this wonderful proceſs. Dr. Black of Edinburg discovered the facts on which this theory is founded; he says that in every proceſs in which heat is generated, a substance which he denominates *phlogiston* is given out, that in the Lungs, as in common culinary fire, heat is extricated, by the disengagement of phlogiston from the blood. From Experiments of Mr Lavoisier and other French Chemists, the existance of Phlogiston has been called in question: But he explains the generation of heat equally well, upon the supposition that it arises from the *decomposition* of *pure air* in the *Lungs*. This last opinion I am inclined to adopt, tho it has no direct influence on the Theory, whether the existence of phlogiston be established or not. Mr Lavoisier and the French Chemists say that the air of the atmosphere consists of *pure* air (or dephlogisticated)

and Azote for phlogisticated, in the proportion of from 1/4 to 1/3 of the former, to 3/4 or 2/3 of the latter. The pure air of the Atmosphere consists of a certain base called Oxygen and Caloric or the matter of heat or fire. In the process of Respiration as in Combustion, the pure air is decomposed in the Lungs; its base unites to the blood, while its heat is set at liberty. The residue of the air is unfit longer, for the purpose of Respiration or combustion, and extinguishes flame and the life of Animals that breathe it. Thus the lungs may be considered as the furnace or Chimney in which heat is generated, and pure air may be considered as the fuel which supports it. That this is the case I infer from the absolute necessity there is for pure air in Animals furnished with Lungs. 2d From the great quantity of it there is consumed, about a gallon in a minute, according to Dr. Goodwin, 14 cubic Inches at every Inspiration. 3d Because our heat is in proportion to the quantity of air we breath; any cause that increases the number of inspirations, increases this effect. 4th Because of the change the change the air undergoes in the Lungs, for it is no

longer fit for the purpose of supporting flame or animal heat, and is now phlogisticated or Azotic air. 5th I infer from the change produced on the blood by the action of pure air, to wit, its Red colour. Many facts concur to establish it as a truth, that pure air is the cause of the red colour of the blood. We see this red colour also produced by the action of pure air on lead which it converts into Minium; also in hams which have been prepared with Salt petre. The difference in the colour of the blood in the pulmonary Vein, & pulmonary Artery, is to be attributed to this cause: that in the Vein being much the most florid. — 6th I infer it from the fact, that the air expired contains leſs heat than that inspired. 7th From the blood of the Arteries being warmer by a degree and an half than that of the Veins; this, according to Crawford, is as 11½ to 14; and Mr Hunter proved that the blood in the right Ventricle of the heart is but 97° while that in the left which has undergone the action of pure air in the Lungs, is 99°. Mr Coleman has confirmed the observation. 8th It has been infered from the analogy of animal

animal heat with burning bodies; the more air is decomposed the more heat is given out, hence the increasing heat from exercise. —

Almost the only objection to this theory with which I am acquainted is, the heat of local Inflamation; and this I think may be explained by supposing that, Latent heat is converted into Sensible, perhaps by an alteration in the ~~other~~ texture of the inflamed part. —

One of the most striking properties of animal heat is, that in all the different countries of the Globe it is, Ceteris Paribus, at the same temperature (Viz. 96° of Farenheit;) how does this happen since that of the Atmosphere varies so considerably? Mr Crawford to answer this question, supposes that bodies, as they part with their phlogiston lose their capacity for heat; in that Ratio, & vice Versa, in proportion to the phlogiston, they acquire ~~heat~~ a greater capacity for heat. This the French Chemists deny and explain the fact in a much more simple manner by supposing the evaporation which continually takes place from the surface of the body to carry off all the super

superfluous heat, as Evaporation is proven to generate much ~~heat~~ Cold. In some cases however, the heat overleaps all obstacles and breaks thro, all bounds; an instance of this kind occured in N. York some time since, a woman went tobed quite well at night and her body was found in the morning reduced to a Coal; attempts were made in vain to explain this fact from the candle she carried to bed with her; but the bedclothes being perfect rendered it improbable that this could have been the cause. The fire that is generated in the Chimney of the Lungs, in this case got an uncontroulable ascendency. I have also read of a case similar to this in the Bibliotheca Medicina of Haller, in a man who was much addicted to drink (See Thornton for the case of John Hettel who was consumed on the 16th of June 1613 in three days reduced to a Coal.) Might there not have been here an Error Loci of heat?

From a Knowledge of this Theory of animal heat we may understand the sublime description of the Leviathan mentioned in the Old Testament (Vide Job).—

According to the observations of Mr Hunter, the Animal body is one degree

hotter in the waking than in the sleeping state. The probability that this decomposition of pure air is the true source of animal heat, is increased by the neceſsity which all Animals have for air: no creature exists in the Universe which does not breathe it. It is neceſsary to Birds, that lest in their very quick flight they should not be able they are furnished with cells as reservoirs of air # all over their bodies. The fish which swim in the water, have also need of this air, their gills are the organs of respiration; if water be deprived of its air by boiling, fish are no longer able to live in it. Insects have such a great neceſsity for air that their bodies are covered with Trachae; if these are stoped by placing the insects in oil or mucilage they suffocate and die. Worms also, which live in the earth, have need of air. — And the Snails which shut themselves so carefully in their Shells, are often obliged to perforate them for the admiſsion of air, if through any accident the original aperture should be closed. Even the Toads which have been found in the centre of Rocks or trees, have need of Air & Respiration, in this situation they have lived one or two

Centuries subsisting on the air admitted through the pores of the Trees or Rocks. —

Fishes derive their heat from their Respiration; they are two degrees hotter than the water which surrounds them. Polypi which appear to be intermediate between Animals and Vegetables, do not expire phlogisticated air, as ~~that~~ Animals do; but like vegetables they Inspire Azotic and expire pure air. Here the great Economy of Nature is visible in a remarkable degree; Animals inspire pure air, and expire Azotic; Vegetables on the other hand, inspire Azotic and expire pure air. In this manner the two Kingdoms mutually assist eachother & nothing is lost. —

I proceed Gentlemen, to point out the uses of Animal heat; they are 1st. By its Stimulus it is one of the causes of Animal Life, as I observed at the commencement of the lecture. 2d. It preserves the fluidity of the blood & secreted fluids. 3d. According to Mr. Hunter it assists powerfully in Digestion. 4th. It renders the senses more acute ~~complete~~ than they otherwise would be; & 5th It increases the sensibility of the Muscles and gives beauty to the face. —

Hitherto Gentlemen, we have con-

considered Animal Life and Animal Heat; I proceed next to treat of *Motion*. Motion is divided into the *Voluntary*, such as is performed by the agency of the will. *Involuntary*, such as is unconnected with the will. as the action of the Heart, Vessels &c. And *Mixed* which partakes of both as Respiration, which, tho' we are able to suspend it, yet the inconvenience resulting from such an effort, renders it impossible to continue it long; this, the only example of Mixed Motion. Physiologists have been much puzzled to account for the origin of Involuntary Motion The learned Dr. Berkeley, Bishop of Cloy in Ireland, has proposed a theory, which, if admitted will remove the difficulty; it is certainly a very ingenious one: he supposes a Child at birth performs the act of Respiration and the action of the heart voluntarily; and that, from habit, we acquire the custom till we are unable to quit it at pleasure, just as we can while walking, perform 20 trifling things and not be conscious of them. Would I could adopt this plausible doctrine; but several reasons force me to reject it. 1st. Because it is purely hypothetical. 2d. Because there are many

instances of Children being born in whom the heart acted & in whom there was no brain, of course no mind, for this could not exist without the former. The involuntary motions are accompanied by no fatigue, which is not the case with the voluntary. As it is impoſsible to arrive to any certainty with respect to this fact, we must rest contented till a future period. I think discoveries of importance will yet be made with respect to this subject. Dr. Chance mentions a case of Colonel Townsend who would suspend the action of his heart and appear dead for a considerable time, and then get up without any inconvenience; but he did this I am persuaded by the intermedium of the Respiration; this he suspended & the action of the heart ceased of course. Nature certainly did very wisely in making the action of the heart, Veſsels &c. &c. out of our reach. The influence of the will would have been suspended in sleep, and of course these actions ceased had they depended on the influence of the will. The only way in which I can remove in any degree, the obscurity in which Involuntary actions are performed is, by supposing these parts

parts much more excitable than any others. ~

When we view the human body in a quiescent State, we behold with admiration the alternate enlargement & contraction of the Chest produced by Respiration. For a definition of this Term I refer to Cullen's Physiology. This proceſs is divided into two parts, Inspiration & Expiration.

The Lungs, the organs of Respiration are sparingly supplied with *Nerves*, these arise from the Recurrents, Cardial, Plexus &c. &c. the lungs of course poſseſs very little Sensibility: The Bronchia, or Ramifications of the Trachae are the most sensible part of the lungs. Several facts prove the lungs to poſseſs very little Sensibility; the 1st is, that wounds made in the substance of the lungs give very little pain. 2d From some experiments of Dr. Monro on the natural state of the parts; he says however that they are *Irritable*, compares them to a Tooth which in its sound state is insensible, but when inflamed, is so tender that it cannot bear the tongue to rest upon it. You will recollect there is a difference between Sensibility & Irritability: Sensibility acted upon by Stimuli gives Sensation; – Irritability

Irritability gives pain. The organs of *Sense* then, are poſseſsed of *Sensibility*; the organs of *Motion* of *Irritability*. The Irritability of the lungs then is much increased by disease & yet it is even then so small, that I never heard a patient complain of pain in the lungs; it is a kind of oppreſsion or uneasineſs not absolutely painful. ——

The causes of Respiration are, 1st Dephlogisticated Air, which acts by its own proper Stimuli; and also the stimulus of the Azote left after the absorption of pure air, stimulating to its own expulsion; the air acts in two ways, first by its own purity; & second, by its heat. 2d. An uneasy sensation in the breast, which is owing to a stoppage of circulation in the small veſsels of the Lungs, & which renders it neceſsary to repeat the inspiration very frequently: Some, from habit are able to refrain from breathing for half an hour, as the *Divers*. ——

The *Uses* of this proceſs so neceſsary to animal Life are, 1st To supply the blood with *heat*; 2d *Oxygen*, both of which are neceſsary for the existance of Life. 3d To discharge the vapour from the lungs. 4th.

4th To accelerate the blood through the Liver, Spleen, & different viscera. 5th It increases the circulation also in the minute vessels of the Abdomen & other parts of the body. 6th It increases the sensibility of the Gall,bladder duct of Pancreas, Kidneys, Intestines, all which it assists to discharge their contents; of the Muscular System, and renders more acute the organs of Sense, as Eyes, Ears, Nose &c. 7th It assists in propelling the Foetus ex Utero; and is of great assistance in discharging the contents of the Abdominal viscera. 8th Smelling is performed only by the aid of Inspiration. 9th In Children it is absolutely indispensible for *Sucking*; - this process depends wholly on the action of the Lungs. 10th And lastly, for the formation of the *Voice*: By respiration only we are enabled to enjoy the pleasures of Vocal Music, Conversation, & the various enjoyments derived from Speech. ——

Respiration is carried on differently in the two *Sexes*: The Male Sex use the diaphragm & Muscles of the Abdomen more than the Female; They breath more by elevation of the ribs and breast. The observation first made by Boerhaave is

certainly a true one, that it was wisely intended to favour Gestation; he saw it in the first year of Infancy: It will enable you to distinguish the Sexes of young Children. —

Our next Subject is the effects, (if I may so term them) of Respiration; I mean Coughing, Sneezing, Yawning Panting, Laughing & Crying. This shall be the Subject of our next Lecture; it is calculated to remove such obstructions as may occur to Respiration. —

Lecture 5th

Our next subjects are Coughing, Sneezing, Yawning, Panting, Hiccoughing, Laughing, & Crying; of each of which I shall proceed to treat; and 1st Coughing; this action is excited by a collection of Mucous in the Trachea or ramifications in the Lungs which form an obstruction to the paſsage of air through the veſsels; also its preſsure on the blood veſsels obstructing the Pulmonary circulation. It consists of Inspiration succeeded by a forcible and quick Expiration. The Abdominal Muscles & Diaphragm always act in Coughing. Coughing comes on naturally in the decline of life; hence the Tuſsis Senilis as Nosologists call it. It is so common in old people that an old man is never introduced on the Stage without it. It is by no means a cause of Phthisis Pulmonalis; it is the mode which nature uses in this disease, of ~~getting rid~~ preventing Death, by getting rid of obstructions in the Lungs.

2d Sneezing. This like Coughing, con-

consists of a deep Inspiration succeeded by a more violent & sudden Expiration: it is excited by any irritation of the membrane of the Nose; as by stagnating mucous &c. and its use is to expell the Irritant. Sneezing occurs as the premonitory symptom of Catarrh; it occurs also at the Crisis of some febrile diseases, & is then always favourable: and the patients recover from the time it occurs. ——

3d. Yawning is a slow full Inspiration, succeeded by an expiration rather more forcible than the Inspiration; it is accompanied ~~by~~ with a gaping as it is called, or wide opening of the Mouth: Its use is to accellerate the motion of the blood through the lungs; it occurs mostly when we are fatigued, as in the evening; also in the morning just after we wake, its use then is to equalize excitement, and it is then accompanied by a motion of the limbs viz. extension.

4th. Panting, consists of quickly repeated Inspirations & Expirations; tends to increase the rapidity of circulation in the Lungs; it occurs after violent exercise, as runing jumping &c.

5th. Laughing, consists of many short quick & imperfect acts of inspiration & expiration.

Laughing when moderate, conduces to health; it is most useful of an evening after the business of the day & fatigue of the day. hence the sensible men of all ages have devoted the evenings to festive Mirth; hence also our public amusements are very properly exhibited in the evening

6th Hiccoughing, is a violent, deep & a convulsive inspiration, accompanied with a peculiar noise; it occurs frequently after laughing, and serves to remove the debility induced by the latter, and is a dangerous symtom in many diseases; it is a convulsive motion.

7th Crying, consists of one deep inspiration succeeded by frequently alternated inspirations & expirations: Crying is of great use to us in excess of either grief or Joy, in the latter it prevents indirect Debility which would otherwise ensue; and in the former the direct by promoting the languid circulation: Crying is generally accompanied with a discharge of tears from the eyes.

Having surveyed the motions of the breast in Respiration, the next subjects on which I am to treat are, Voice & Speech. The analogy of the parts concerned in these wonderful powers of the human Animal, you will hear

described with more advantage from the Anatomical Chair. I shall therefore pass to the Physiology of it. Physiology is to Anatomy what Philosophy is to Natural history, one being a description merely of the subject, the other, (physiology & philosophy) unfolding the causes of the various phenomena which present themselves to view. ——

I. The parts concerned in the formation of the sound we denominate voice are, the Trachea, Larynx, & Glottis; I exclude the Epiglottis whose use I conclude consists entirely in covering the Glottis when food is swallowed: According to Dr Monro the voice is produced by the tremors of the Cartilages of the larynx, trachea &c. as from those of any solid body; because he says these tremours may communicated by a dense substance as Mettal, wood &c. and propagated along it in such a manner that Deaf-people may be made to hear them. This question, whether voice is produced in the same manner as sound from chorded, or whether as from a wind instrument, or both has been much disputed by Physiologists; both suppositions have met with many able advocates. I formerly thought the voice to be produced as from a chorded Instrument, but for several reasons I have altered my opinion. 1st because the strings of

a Violin want only stroke of some body to produce sound; a stroke however on the tense cartilage of the glottis does not produce sound. 2d. the lungs of a dead animal inflated and the air be made to pass from them by pressure on the Thorax, sound very similar to that of a living voice is emitted; now in the dead body no tension of the Cartileges exists which can explain this effect. 3d. If it is owing to the tension of the Cartileges of the larynx, how is it that this tension may be destroyed by dividing the Cartileges, and yet sound be emitted? Mr. Fox has proved that the cartileges of the Larynx may be removed & yet sound be emitted; he dissected out the larynx of a Pig, and upon the parts healing the pig emitted its accustomed sound. 4th. In Chorded instruments the more tense the chords are the more acute are the sounds, now the cartileges of the larynx are certainly firmer harder & more tense in Men than in women; they should of course have more acute voices than women, yet this, it is universally known, is not the case. The Uvula contributes much to sound, its loss is followed by an alteration in the voice; & yet the uvula so far from being tense, is very soft.

5th. In blowing the Nose the noise is proportioned to the greater or less velocity with which the air passes out of the nostrils; this cannot be explained by the supposition of a chorded Instrument. 6th. The resemblance between the ~~organs of Speech and~~ formation of the organs of speech and wind instruments affords strong presumption that the sound is produced upon the same principle in both. Is sound increased by the density of the air in a wind instrument? So it is in the voice. Is sound ever produced by by Reverberation, and increased by it as in the convolutions of a Conk-Shell? So is the voice by the various cavities about the Fauces. Is sound increased by the inequality of surfaces? So is the voice by the Teeth, Palate & Lips, Tongue &c. Is sound in a wind Instrument rendered more acute by the narrowness of the aperture? So is the voice by narrowing the aperture of the Glottis mouth & nose, and is not so when they are distended. Is sound proportioned to the quantity of air expelled from a wind instrument? So it is in the voice. Birds afford us a proof of this, they have, as I elsewhere observed, cells for containing air all over their bodies, their bones feathers &c. this air is employed

by them in Singing. 7th The voice like wind instruments is capable of producing Echo if in a place favourable for this; chorded instruments do not produce this effect: Articulate Sounds are produced in this manner. 8th I infer that voice is produced as from a wind instrument from the influence diseases of the cavities communicating with the fauces have on the voice; thus a disease of the Frontal Sinus renders the voice horse and unpleasant by the matter collected in them; when this matter is discharged an alteration is perceived in the voice which can have no connection with the tension of the cartileges of the larynx. Having mentioned the reasons which induce me to suppose that voice is not produced in the same manner as sound from chorded instruments but as sound from a wind instrument. I shall treat the subject upon this supposition.

Mr Dadont computes that there are 632 vibrations of the glottis in a minute in some sounds; this number will appear incredible till we recollect the accuracy with which musicians will detect a deficiency or superabundance of these vibrations

in sounds. The musicians compute their
. . . . . quadrata to be performed in the $\frac{1}{15}$ part of a minute; this divided into four parts, and each of these 4 into 16 distinct quadrations in sound, so that in the fifteenth part of a minute there may be 64 distinct various sounds, or 960 in a minute, every one of which is performed by a distinct action of these parts. —→ Matter, philosophers tell us "is divisible ad infinitum", and from these musical calculations it would almost appear that sound is so too. —→

Sounds are either acute or grave; — strong or weak: the acuteness of the voice depends upon the straightening the glottis; the gravity on the contrary, upon the expansion of the aperture of the glottis: if we attempt to render sound very acute or very grave the voice is lost; in the first case ~~place~~ it depends on shutting the glottis, and in the second on the too great width. Strength or weakness of sounds are the greater or lesser quantity of air expelled, and perhaps also on the action and position of the mouth, tongue &c. &c. The teeth may have an influence on it, & hence perhaps we may explain the fact that

very young and very old persons have their voices much weaker than adults of middle age.— *Whispering* is when the air is not expelled from the lungs with sufficient force to excite tremors in the Glottis. If you lay your hand on the head of a person who whispers you will not feel any on his head, but if you place your hand on the head of a person who speaks loud you will perceive a very evidently tremulous motion on his head.—— *Singing* is a particular modulation of the voice, in that the sounds are protracted.—

The human voice undergoes a very remarkable change at the age of puberty, especially in Males; the sudden stoppage of the growth perhaps, or some other cause at this age is the source of many diseases, as I shall hereafter have occasion to mention.—— Our power over our voice is very great, we can modulate it as we please. The passions exert a great influence on the voice; thus it is soft in love, quick and fierce in anger, humble and low in supplication &c. &c. Many other circumstances have a great influence on the voice, Country is one principle one,

Americans and Europeans, may be distinguished by their voices. Not two of the United States resemble eachother exactly in voice. Shelhammer relates the case of a boy who, from being bred among Swine acquired a habit of Speaking very like their grunting. — The voice depends on the *recurrent Nerve*, if this nerve be ~~destroyed~~ divided the voice is destroyed; Paralysis of this Nerve either partial or complete produces *Aphonia* and *Paraphonia*, the first an entire loss of Speech, the latter partial loss of it. —

II. ***Speech*** gives Man a rank above all other Animals: Reason is possessed by many animals in some degree at least, but in Speech he is blessed beyond them all. I do not call here the words which some birds are taught to pronounce Speech, they are as truly mechanical as the sounds from a violin or bagpipes. Speech is wholly imitative; Children generally acquire it in the first 15 or 18 months of their lives; many do not acquire it till a much later period; I have known three instances in this city where it was not acquired till the 5th year. — In delivering the process of Speech I shall confine myself to facts and observations

which I have myself made. ——

Speech Gentlemen, begins at the glottis and extends to the Tongue and ends on the lips; I repeat it, Speech begins at the glottis extends to the tongue and ends on the lips; — the first use of the Larynx is in crying; this, tho, it distresses parents as it is generally a sign of pain, is intended by nature to prepare the organs of speech for use; the muscles connected with speech are suppled in this manner and rendered fit for the actions which they are afterwards to perform. 2d. Laughing is the next means employed for purpose; — No animals but Man either laugh or cry tho' all express pain by some means and some by tears. — 3d. The next noise of an Infant is, that of Crowing, this is a slow expulsion of air from the Lungs, together with some action of the glottis, the sound is Whee! Whee! Whee! a joyful sound to Mothers: As they advance in age to the 7th or 8th Months they begin to use the tongue and dad! dad! dad! is the first Salutation of a child to his father (you observe Gentlemen that the lips are not used in this mono-sylable) hence the term daddy arose. — The lips are next used, and at about the 9th or 11th

mouth, Pap! and Mam! are first pronounced. It is worthy of remark that in all languages labial ~~letters begin~~ and Lingual letters begin the words used for father and Mother, excepting the words father and mother in the english language; — As, (English) Papa, Mama, (French) Père, Mère (Spanish) Padre, Madre, (Greek) Papas Mamas &c. &c. Thus the first 18 months of a childs life may be supposed to be spent in the preparation of the organs of speech for that office; by this time the growth of the teeth is progressed considerably and they are now capable of pronouncing: In the pronunciation of these their little eyes and ears are of singular use; the motion of the lips of the persons who speaks to them gives them — some instruction, and if they are unsuccessful in their attempts at imitating them in the pronunciation of words their ears can correct them. Nouns are the first words — which children generally learn, some of these they acquire the pronunciation of with facility; in this case they should be made to repeat it over several times and they will — seldom forget it; but if they lose the mode of expressing a thing by its name they seldom acquire it for months unless by accident

they hear it pronounced or are corrected if they miscall it; Instances of the last mentioned facts I have frequently observed; thus I knew a child who acquired the pronunciation of the potatoe, but by not being obliged to repeat it forgot it, and for 3 months could not utter it. I knew another Child who, from the consent of its parents to understand ~~it~~ what it meant, called a Charriot "taw" & Sugar "pilly" for 6 months after it had learned to speak. Had the first Child repeated potatoe 5 or 6 times it never would have lost it; and had the parents of the second refused to understand what it meant by taw and pilly, it would have probably found out the proper-names for Charriot & Sugar. —— An ignorance of the proper method of using the tongue and muscles concerned in speech is a great source of inability of children to speak plain. If they grow old in the habits of speaking wrong they seldom can conquer it; very few foreigners are able to acquire the true English pronunciation of "th" as it occurs in this, that, then, there &c. had they when young heard propperly pronounced, they would probably have been able

able to pronounce it proper. Rules for the motion of the lips and tongue are of service in learning to pronounce particular words; I instructed a Child to pronounce V, by directing him to place his upper fore teeth upon his lower lip, to make an expiration and at the same moment to sepparate his teeth and lips giving it the E sound, for Vo, Va &c would be pronounced at pleasure; this he found succeeded & has since pronounced it with ease. ~~&c~~ —

The different languages require the use of different muscles and parts of the organs of Speech; some languages consist of many more vowels than others, as the Italian; some are remarkable for gutteral sounds. The Indians have many gutteral sounds, it arises perhaps, from their Indolence, as they require very little motion to be made with the tongue and lips. The Italians use the Uvula teeth & fauces very much: The hebrew language consists principally of gutteral, Palatine and Nasal sounds. —

Since speech has been pretty well understood several attempts have been made to teach the Dumb to Speak!

A Mr. . . . . . . a cotemporary of Boerhaave made the first essay toward the accomplishment of this humane purpose & considerable success has attended his efforts, in these endeavours the first thing done was to suple the Larynx; Mr Brandwood did this by stroaking the throat in so rough a way as to excite great pain in his pupils, then he directed his dumb pupils the method of placing their lips, teeth and when and how to inspire & expire, by writing, for instance if he wished them to pronounce the word paper, he would direct them to place their upper and under lips in contact, to make an expiration at the same time that they opened their lips and gave it the a sound, this would be pa. for the 2d syllable he directed as above only to bring the teeth together after the p was sounded so as to give the r sound, this would be per or pr.— The motions of the lips are of consequence, indeed some people can almost hear with their Eyes by carefully observing the motion of the lips, as Caro Boerhaave nephew to the celebrated Dr B. was said to be able to hear ~~with~~ by his feet and hands by the tremors which he felt in

in those parts; this was more properly the translation of sense. You have heard probably of Ventriloqui, this is a deception, the only difference from the common mode of talking is, that they form sounds during Inspiration instead of Expiration.

What an uncommon number of motions the Glottis and muscles of Speech are capable of you may have some Idea from the consideration that the English language consists of 40.000 words each of which require a different motion of these organs, and there are many who speak all the Ancient and many of the modern languages, so that probably many of them pronounce several hundred thousand words.

The uses of Speech are ~~various~~ many it raises Man above all the creatures of the Earth; by it Sages were enabled to teach Children before the art of writing was invented; it enables us to transact & get through the business of the world with ease; it affords us one of the most sublime gratifications of which the human mind is Susceptible, it is

it is the vehicle of Eloquence, friendship and love; and lastly it enables us to address the great father of the Universe and celebrate his praise among the Children of Men.

Lecture 6th

I proceed next Gentlemen, to consider the *circulation* of the Blood.— In prosecuting this subject I shall treat first of its course after it has gone thro, the action of the Lungs. 2d Of the peculiarities of the vessels which circulate the blood.— 3d Of the powers which move the blood, & 4th of the principle uses of the Circulation.—

1st Of its Course. . – – – – – – –

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2d The peculiarities of the vessels designed for the circulation of the blood. 1st The *Heart*. the position of the heart you all know is in the cavity of the Thorax, having a bony case on every side.— 2d The Pericardium which surrounds it, is designed

to keep it from comeing in contact with the contents and parieties of the Thorax which might impede its motions; and also serves by its vapour to keep it moist. 3d. The heart is supplied with blood from the Coronary Artery, and with Nerves from the Cardiac plexus. 4th It poſseſses heat, Sensibility & Irritability more by far than other Muscles: It may be excited into action immediately after death, by water, an Electric Spark, by vapour, heat, and in short by any Stimulus. 5th The number of its contractions are about 5000 in an hour, and this it does without any intervals of rest in the longest lives. The right ventricle beats longer than the left by several strokes.

2d. *Arteries*. These have three coats &c&c. Haller and Dr Hunter say the arteries do not poſseſs *Excitability*; this I shall endeavour to prove they do poſseſs in a subsequent part of the lecture, and shall quote a paſsage from Haller where he even confeſses what he strenuously denies in other places. 2d The arteries poſseſs nerves & bloodveſsels as other parts of the body; their bloodveſsels are called Vasa Vasorum. 3d. The arteries poſseſs great Elasticity and Strength; these are more remarkable in

proportion to their distance from the heart. — Mr. Wintringham has proved that 150lbs. are requisite to break some of the Arteries. I say the strength and irritability is greatest farthest from the heart; this is because the Substance of the small Arteries is greater in proportion to the bore or capacity of the artery than in the large ones. 4th. the arteries generally Ramify at acute angles, tho' there are exceptions and they frequently anastomose or inosculate; the use of this is to supply blood when one of the arteries is stopped up or obstructed by the anastomosing branches as in case of aneurism in the extremeties. —

3d. Of the Veins: the peculiarities of these is next in order: the veins have a muscular coat as well as the Arteries. — the Muscular fibers can be plainly distinguished in some of the large veins near the heart. 2d. the veins having less occasion for strength, are less strong than the Arteries. 3d. The veins are more numerous than the arteries, for besides one principle vein which accompanies the arterial trunk, there are superficial veins on the surface of the body about the extremeties, & sometimes on the forehead. The veins have one very remarkable

peculiarity; the valves; these are situated in every part of the veins. —

The heart possesses in itself the power of motion: the distintion of it by the blood is the stimulus which excites this action. — and 2d. The influence of the brain excites — motion in the heart, and the heart in turn, excites action in the brain. Dr. Cullen denies that the influence of the brain can produce this contraction, because from habit it would lose its power of stimulating, but he might with as much propriety — expect the stomach to be insensible to the stimulus of food from long habit. — That the brain has influence on the heart is proven by the phenomena which occur in diseases of the Cardiac Nerve. 2d. The heart contracts from the stimulus of oxygenated blood according to Dr. Godwin; the contraction of the left ventricle only, can be thus accounted for, for the right ventricle contracts without this stimulus. In experiments made to prove this no accuracy can be expected, for the pain which the animal suffers in the experiment has great influence on the action of the heart. — The heart often pulsates so strongly that

that it can be heard over a room of considerable size; and Mr. . . . . . Quotes from Forestus, Piso & Fanellius cases in which the bedclothes of patients have been seen to rise and fall as the pulsations of the heart.– In these cases I think the action must have been convulsive and morbid.

III. The powers which cause the circulation of the arteries are 1st The heart's action, 2d The Specific Stimulus of the blood. 3d The Stimulus of pure air in the blood. 4th The Irritability of the arteries; this Dr Haller denies, but in a chapter on Arteries – (32. Sec) he indirectly assents to it (a long quotation from Haller comes here). This irritability of the arteries is the cause of their action when the heart cannot act, if for example, you place one leg over the other in such a manner as to press the popliteal artery, the foot will move with every stroke of the artery; now here the force of the heart cannot act; it must arise from an irritability of the muscular fibers of the arteries excited into action by the blood. 5th The quantity of blood in the body has an influence on the circulation. It is supposed that about 25lb of blood are in men in

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comon circumstances of health &c. The immortal Hervey was so certain of the action of the arteries that he emphatically calls them the "primum vivum" and "Ultimum Movens" of the body. The bloodveſsels are certainly of the greatest consequence to the Animal; all the other parts are subservient to them. the Stomach, Glands, Viscera &c. are all formed for their service. A Dr. Vanshore has published a diſsertation on the excitability of the arteries, and which he proves to exist from experiments. This doctrine forms a principle part of my Theory of Medicine. I add further concerning the importance of the veſsels, that they are the Centinels placed to guard the system in the sleeping State: the other functions of the body cease, but the action of the veſsels never cease.

Let us next enquire how the motions of the blood are carried on in the Veins. The Stimuli which excites this motion are 1st the preſsure of the contiguous Muscles. 2d By certain of the Abdominal Viscera & Diaphragm made indirectly by the abdominal Muscles, and also by the contiguity of Arteries whose pulsation quickens the motion of the

blood in the veins, one of which, as we before said accompanies every artery. 3d. Respiration. 4th. A peculiar Irritability in the Arteries, — this Dr. Varshore & Haller have proven to exist in the veins. 5th. The Mixture of Lymph & Chyle in the blood, this acts by rendering the blood less viscid than before. (Haller was then quoted to again to prove the irritability of the veins, his 42 section on that subject.)

IIII. It remains now Gentlemen that we mention the uses of the Circulation of the blood. 1st. To excite action in the brain, which ceases as soon as the blood is stopped, hence Syncope when its supply of blood is stopped. 2d. To distribute the heat generated in the lungs to different parts of the body. 3d. To distribute a certain degree of moisture to the body. 4th. To afford the fluid from which all the secretions are made. 5th. To convey nourishment to the body and prevent its decay. 6th To impart Sensibility & Irritability to the System. 7th. And Lastly To by supplying a Nervous fluid to the different parts of the body by the friction of the blood against the vessels.

Great Revolutions have taken place in the opinion respecting the Arteries within these 200 years; it is since this time that they have been discovered to carry blood. — The name of Artery is a testimony of the erroneous Theory of their functions: we find Authors describing in the Antient works, the heart as consisting of bone & covered with hair &c. &c.

I cannot conclude this Subject without paſsing a tribute of gratitude to the immortal Harvey the discoverer of the circulation of the blood. This celebrated character derived no aſsistance from the labours of his predeceſsors or Cotemporaries but like an . . . . per se: he derived nothing from the collision of his opposers, all his discoveries were his own. Envy in vain attempted to blast his laurels. Some of his Cotemporaries pretended that he derived his Knowledge from some experiments of a Frenchman, or an observation of Hypocrates. The alarm then given, others aſserted that he took the hint from the writings of Hippocrates himself. So impatient is Error. The discovery of the Circulation is one of

the greatest with which Physiology has ever been enriched: but I look forward to the time when we shall be as well acquainted with the misteries of the brain & mind as we now are with the Circulation of the blood. 30 or 40 years ago the use of the valves of the Aorta and Pulmonary artery were wraped in as much obscurity as those of the Nates, Testes, Pineal Gland, Corpora Striata, Ventricles &c. of the brain now are. Discovery will not cease in Anatomy & physiology any more than in navigation, while there is any Terra Incognita in the animal body.

Our next subject in order is the consideration of the Nervous System and of this as I have just said we must lament the obscurity: physiology on this subject is dumb: To posterity I commit the discovery. In the Nervous System Include, Muscles, Brain, Tendon, Nerve & Mind &c. The origin of the nerves is the Brain, Cerebellum, Medulla oblongata & Spinalis. It is said by some that the nerves of voluntary action arise from the Cerebrum or brain; — Those of the Involuntary from the Cerebellum.

* Recent discoveries render this doubtful. C. S.

This I believe is without foundation: It is worthy of remark however, that four out of the five senses are within one Inch of the Brain. From these two facts, the origin of the Nerves and situation of the organs of the senses being placed near the brain, I infer that the brain is the seat of the mind. 3d I infer from the quantity of blood spent upon the brain, towit, according to Haller 1/5 and 1/10 according to Dr Monro of the whole blood of the body. The structure of the arteries of the head are very flexible and their coats thiner in the brain than in the ~~any~~ other parts of the body. 4th I infer it from

5th The fabric of the brain appears to be glandular secreting a fluid whose consistance is thiner than that of the brain. 6th The veins of the brain differ from those of the other parts in being void of valves till they make their exit from the skull. 7th There are no Lymphatics in the brain.x 8th Man has more brain than animals which have no mind, and the quantity of the brain appears proportionate to the strength of the mind of man. ——

Professor Blumenbach procured

with difficulty 10 Sculls of persons of different Nations and found the shape of the skulls of them all different: They differed with respect to the length of the forhead; the projection of the Supercilia; the roughness or smoothness of the forhead; the greater or less perpendicularity of it; in the size of the Nose; the capacity of the nostrils; prominences of the cheek bones & many other particulars; lastly of the projection of the lower face. The ten Nations were the Ottoman Turks, Tartars, Calmucks, three nations of the Moors, some of the North American Indians and Carribees of the Island of St. Vincents. We said Man has most brains, Dr. Monro to prove this weighed the brains of an Ox and that of a Man, & found the Man to have 6 times as much as ~~that~~ of an ox. The Man weighed but one 6th part as much as the ox, so that in the proportion the ox had the 36th part as much as the Man

The Nerves are composed of Whitish Chords, these arise as we before observed from the brain &c. and ramify all over the body, or I would rather say they commence in all parts of the body and

terminate in the brain as Dr Volle and Fowler have aſserted. They contain a medullary substance similar to that of the brain. – Like the arteries more of them are distributed to the muscles & skin than to the bones viscera &c. this is because sensation and motion are of more consequence to the former than the latter. The branches of the nerves are generally sent off at acute angels; though sometimes at right angles. Dr Monro takes notice of serpentine lines observable in the nerves; the uses of these have not yet been pointed out. The nerves have everywhere Ganglions at certain distances from each other, these he supposes are little brains as it were in which a new supply of nervous fluid is generated; for the nerves are supposed to produce sensation by the conveyance of a certain fluid: Most of these ganglia are observable near the heard and vital viscera. The fluid Dr Cullen denominates Æther. this name I shall neither adopt nor reject as I have mentioned an opinion that it generated by friction against the bloodveſsels; the nerves are perhaps its conductors. Many have supposed

the nervous fluid to be the Electric fluid, and some experiments of Mr Galvani and several others has given some force to this opinion; but I doubt this fact very much. The phenomena of Electricity are very widely different from those of the Electroid fluid as I have called it, (a fluid somewhat resembling the Electric) – The manner in which the power of this fluid is shewn is, by laying bare the principle nerves in the leg of a Frog, as the Sciatic, this is to be coated with Tin Foil by touching with a piece of Zinc one end of the Nerve and the other with Silver, convulsions of the frog are excited: the experiment may be varied in many ways. These convulsions are repeated 100 times after the death of the animal. The heart may be made to act in the same manner. It differs from the Electric fluid 1st. It exists in an accumulated state in the nerves at the same time that a conductor is applied to them; this would not be the case with the Electric fluid which would fly off. 2d. It differs in ~~the~~ from Electricity in the nature of its conductors. Charcoal which is a non

nonconductor of Electricity is one of the most powerful conductors of the Electroid fluid - Fluids again which are nonconductors of the former, conduct the latter most powerfully 3d The Electric fluid stimulates plants to - growth; the Electroid has no such power - 4th The former disposes to putrefaction, the latter resists it. 5th If a shock of Electricity applied to the Tongue it gives pain without any particular sensation, whereas the Electroid fluid has evidently a Saltish taste as may be perceived by a very simple experiment - place a piece of Zinc on your tongue, and a piece of Silver under it, bring the edges of the two mettals in contact at the tip of the tongue & the saltine taste with a slight shock will be perceived. There is a difference in the Odor, the Electric fluid smells like Phosphorus, the Electroid has no odor. The Shock from the Torpedo or Electric Eel (Gymnotus Electricus) is known by Dr Fowler to be different from the Electric shock. 2d Dr Fowler proves that the Electroid fluid is increased in an inflamed part; that nervous diseases may probably be explained from this source; and that Sensation chiefly depends on this Electroid fluid. In aqua

In aqua Arthritica and . . . . in the head. . . .
- - - - - - - - - - - - - - - - - - - -

. . . . 1st. As Nerves are the organs of sensation, the brain of thought, so are the Muscles of Motion. 2d. The Nerves are not the same substance as the brain, but connected merely by juxta position. Muscles are not continuations and expansions of Nerves, they are composed of fibres connected together by Celular membrane. 3d. Every muscle becomes shorter and wider when it contracts. —

Thus far Gentlemen is a plain road, but when we consider the senses which is our next object we enter a wilderness, where I am sorry to say I see many footsteps returning but none advancing: before we enter let me observe that we have seen the brain, Nerves & Muscles, the organs of Motion sensation and thought in which I have considered animal life to consist; but some Animals exist which have Nerves & no brain, the nerves originating from the Spinal Marrow. these have sensation and Motion but no thought, of course do not enjoy perfect life Is the power of Motion in the Muscles —

owing to a Vis Initia? This I admit with some limitation; it is the opinion of Mr. Hunter & Dr. Haller. I believe it it depends very much on the Nerves and is I think the Electroid fluid or Ether of Cullen, and I think it is generated as I before said from the friction of the blood against the coats of the vessels. ——

Lecture 7th

Our last lecture was concluded with the commencement of the subject of Muscular action; with this I shall proceed. Muscular action differs from Elasticity in several particulars 1st Extension of an Elastic body is necessary before that body can contract; but Muscles contract before any extension is used. 2d Elasticity is increased by the tension of bodies, but muscles are not thus. 3d Muscles possess a power much greater in the living animal than they have immediately when taken from the living animal. Now this force is excited by the will, and this stimulus is sufficient to cause a Flea to raise a stone or other substance 80 times heavier than itself, as has been proven: Horses too can raise a weight infinitely heavier than themselves, and yet the muscles and tendons of a horse would break with much less force weight when out of the body. This fact is of extensive application in pathology as I shall observe in treating of Convulsions. —

Having thus treated of the Nervous System and of Muscular action, I proceed next to the means by which Motion is performed. I shall thus examine the effects of Impressions as 1st Sensation and 2d Motion.

1st Of Impressions; these I have considered fully in the Lectures on Animal Life and to these again I must refer you; they contain all that is necessary on this subject. I proceed to

2d Sensations, these are Simple or Reflex. Simple sensation is the mere knowledge that impressions are made: The Reflex are such as convey an Idea to the mind of the quality or nature of the impressions, as sensations are agreeable, pleasureable or delightful or on the other hand disagreeable, unpleasant or painful: These grades may be thus illustrated; the sensations we receive from the sight of a fine prospect is agreeable. That from a glass or two of wine or opium in such quantity as to exhilirate the spirits may be called pleasureable, and the delightful result from the sensual gratifications. The disagreeable is instanced in viewing a disagreeable or disgusting object: the unpleasant such as occurs in lowness of Spirits from Nervous affections &c. The painful arise

from any Surgical operations, burns, insisions & other injuries. Does Sensation always result from impression? I answer No, The motion of a muscle after it is cut out of the body is not attended with Sensation. The opperation of a diuretic medicine is not attended with any Sensation; little Sensation results in some instances from purging medicines. The sensation resulting from impressions is not always in the spot where the impression exists. For Stone in the bladder often produces — sickness at Stomach. Other examples will probably occur to you. Sensations do not always, indeed very seldom inform us of the impressions in producing them; — as a sight of colours never give us a hint that Colour depends on a reflection of Rays of Light; Nor does Sharp Sounds, to use the words of Dr. Haller, give us the Idea that it is produced by vibrations of the air which are 5000, in a second of time. — It is the will of the Creator that certain impressions on the Nerves shall excite Ideas in the mind the same in all persons, and at all times in the same person when in the same degree. —

Let us next attend to the Laws

Laws of Sensation, these are 1st. All Sensations are proportionate to the force the impressions & the excitability of the part to which it is applied 2d. The force being given, the sensation is proportionate to the duration of the impression 3d. Only one sensation can exist at the same time; — Take notice of this law Gentlemen, it is of the utmost consequence: If for example I pluck a hair out of a persons head, and at the same time strike him a blow on the part, the sensation which would otherwise have been made by pulling out the hair is lost by the more forcible one of the blow, for the more forcible stimulus gives the sensation. If you give a Dog nux vomica and a severe whipping at the same time, the Emetic will not opperate. Take notice I beg you Gentlemen of this fact, it is of the most extensive application in our Therapeutics; even Hippocrates observes it: we see it instanced again in Music; if a number of Musicians play upon different instruments; tho' the sounds themselves are widely different, yet the unison gives us the sensation of harmony. Again, in Colours, if a boy paint his Top of different colours and whirl it, the colours

colours are confused and give us the Idea of one colour; — or if to the Eye be presented blue and yellow in the same place, the Idea of green is excited, for this purpose they must be Synchronous. It has been said that Julius Caesar dictated to 6 Amanuenses or Clerks at the same time, and this fact has been urged to shew that he could have 6 different Ideas at the same time, or think 6 times as much as other people; but his Ideas were not synchronous, they succeeded eachother, — perhaps rapidly, but they did not all exist at the same time. In reading we see the power of habit in accellerating the succession of Ideas in our minds: It is probable that each word and even every letter conveys a sensation to our minds perfectly distinct but so rapidly succeeded by each other as to give us the Ideas of the author very rapidly; we acquire from reading a habit too of foreseeing the letters & words which follow each other. Children afford an example of this when they have been reading a little at School, they frequently confound the words which begin alike from this cause, as needless & needful,

useless & usefull &c. &c. Printers too fall into the same error placing Country for County &c. I have seldom sent a pamphlet to the press which I have found free from mistakes of this kind, and have had either to correct the proof sheets or to suffer them to go before the publick. The quick conception which the mind has the power of acquiring from Reading has made it be called very emphattically and justly a Sixth Sense. Dr. Whytt, as well as myself, differs from those who think it is done by means of receiving more than one Sensation at once.

Another law of Sensation is, that it continues a considerable time after the impression which excites it is removed; Thus — persons who have suffered Amputation feel an itching in their feet an hour after their limb is removed. 2nd. There are some impressions so forcible as to destroy Sensation; thus the system becomes, in some cases insensible to the action of Stimuli, from the action of very powerful Stimuli, as the Miasmata which produces the Yellow fever, Plague &c. Opperations in Surgery too, afford an instance of it: At the commencement of Surgical opperations the patient feels excessive pain, this before the opperation ceases, subsides, & he is easy.

Next of Sensibility & Irritability

The former is supposed to be inherent in the Nerves, the latter in the Muscular fibres: They are not equally diffused through the healthy body; for instance the heart has much Irritability and little Sensibility: These are supposed to vary with age, thus it is supposed the Lungs are poſseſsed of much Sensibility at birth and to looſe it as we grow older; how this is I will not undertake to decide, but that the influence of habit is very great I am fully convinced. I shall make a few observations on each and first of Sensibility.— 1st All impreſsions convey a stronger sensation at their first application; and the longer a Stimulus is applied the weaker is its action;— thus if we continue in a temperature which was at first unpleasant from heat, we are able to continue in it without inconvenience.— This is not the case in all instances; a drop of water constantly droped on the head becomes painful, tho' at its first application it excited no uneasineſs;— it becomes at last most exquiſitely painful, and was used in the Inquisition as a mode of Torture.— 2d Impreſsions require to be increased after habit has rendered them inactive,

in order for sensation to be produced; thus 62° of Farenheit is the temperature at which people of middle age feel comfortable, but old people feel cold if they are in a leſs temperature than 70° or 75°— 3rd Stimuli which at their first application were unpleasant, become pleasant by repetition, the sensation being thus changed; tobacco for example, and Ardent Spirits are at first very unpleasant, but habit renders them both agreeable; this fact — obtains in Morrals aswell as Medicine. Shakespear was well acquainted with it as he proves in the following paſsage in one of his most admired plays.

"Aſsume a virtue, if you have it not;
"That monster Custom, who all sense doth eat,
"Of Habits Devil, is an Angel yet in this,
"That to the use of actions fair and good
"He likewise gives a Frock or Livery,
"That aptly is put on. Refrain tonight,
"And that shall lend a kind of easineſs
"To the next abstainance; the next more easy,
"For use can almost change the stamp of nature
"With wondrous potency: &c.. ——

4th Certain impreſsions lose by repetition the force by which they acted; thus Antimony, Jalap, Opium, and other Medicines require

to be used in larger doses in such as have been accustomed to their action: This shews again the powerful effects of custom on the Sensibility. Thus we explain the fact that natives of the West Indies become insensible to that most powerful Stimulus, the Miasmata of Yellow fever. 5th. Sensations arising from comparison become more acute by repetition. 6th Two Sensations which arise from impressions made at the same time are afterwards connected in our minds; this I explain from Association of Ideas, is first natural and 2d. Artificial; for an example of the Artificial, if we hear the first line of a poem which we have read, it recalls to our recollection the subsequent parts of it.

The influence of habit on actions which depend on the *Irritability*, is also very great. 1st. Motions by repetition become habitual; thus when we go to bed we make water every night, or attempt it, tho we have just before emptied the bladder; this may be called Association of Motion. 2d. The actions of muscles by repetition become corrected; thus a Child will, in attempting to throw itself on the Mothers breast, move in every possible direction but the right one; but

but by frequently repeating the attempt the action is corrected. 3d. Repetition of muscular action is followed by an increased power in the muscles to perform the action; this is evident in dancing;- the muscles acquire the proper mode of performing the action, and increase their power of performing it by repetition;- also in Rope dancers &c. &c. 4th. Certain actions, by frequent repetition become Involuntary, as winking, and as has been said by some, Respiration;- but you recollect that I said no certainty exists that Respiration ~~ever was performed~~ was ever commenced Voluntarily.- 5th The Strength of muscles is increased by repetition and gradual increase of action; thus a man who lifts a Calf every day for a certain time, will at length be able to lift an Ox. 6th By repetition the act of Respiration may be more and more dispensed with; in Divers who are accustomed to holding their breath as it is called, they can stop their respiration without inconvenience for 2 or 3 minutes while we cannot for half a minute. 7th There is a repetition of motion some cases without the Stimulus of impression to produce it, but merely

that of Custom, as in the case of making water before going to bed. 8th Repetition of certain motions together is followed by a particular inability to perform them separately; thus it is difficult for us to move one hand in walking without moving both; and in the fingers it is difficult to distend them separately. 9th Repetition

. . . .

. . . .

10th Repetition fixes the period for the return of certain motions; thus we wake generally at the same hour in every morning; hence perhaps the periodical return of many diseased acts, as the paroxysms of Intermittent fevers. Thus then I have mentioned the effects of habit on Motion, Sensation and Thought, or in Animals while alive.

I proceed next to take notice of that power by which impressions on one part produce motions in ~~another~~ others remote from it; this power is called *Sympathy* and is divided into active and passive. – the former is increased in the same ratio in which the latter is diminished. Sympathy has been by some explained by the supposition that the Nerves were concerned

in it. Dr Whytt has written a dissertation in which he disproves the agency of the brain and Nerves in Sympathy; for no communication by nerves exists between the Stomach & Skin, or of the breasts with the Uterus, & yet the parts sympathise very strongly. The Sympathy of the bladder with the Stomach and of the Stomach with the Soals of the feet - cannot be explained upon this ground. Tetanus is produced by wounds in the feet, and yet no communication by nerves exists between the feet and temporal Muscles. - Mr Whytt mentions amongst others, the following case of Sympathy inexplicable from this Supposition of the nerves. 1st The noise made with a file on Iron or the scratching of Glaſs affects the teeth by Sympathy with the Ears. 2d The itching in the Glans penis from the Stone in the bladder, this is a common symptom of the disease, I have seen the glans in so irritable a state from this cause, that the rubing of it brot on such Inflammation as ended in mortification of the parts. 3d The rising in the throat in Hysteria; the itching of the nose of Children who have worms, cannot be explained upon this principle. I would explain these upon the

supposition that the whole body is ~~lined~~ covered with the same membrane which lines the Stomach and Alimentary canal.— The Plague I have heard has been known to to act on the fingers and produce the disease in that way. 4th Dr. Wm Hunter observes in his account of the diseases of Jamaica, that in the Dysentery of that Island, the patients generally have a very remarkable symptom, which is, that whenever they swallow any food solid or liquid, they experience by a sympathy between the Mouth and Anus, a sensation as if what they eat was passing through them; they are precipitated to go to stool, and till the Slimy mucous matter they discharge convinces them of their error, they believe that they have discharged the aliment swallowed. 5th Does not the Sympathy between the Uterus and Rectum afford an argument in favour of the supposition that Sympathy is carried on without the intervention of the brain? 6th The Softness and relaxation of the Skin which occurs in the Yellow fever, is explicable without the supposition of any sympathy, from the emptiness of the vessels of the part.

Were I to pursue the course usual among Physiological writers, I should in this place proceed from the Nervous System in general, to the Senses, Faculties & operations of the Mind, also the causes of pleasures of the Senses, and a consideration how Motion Sensation and Thought are preserved from extinction in the Sleeping State: but before I proceed to these, I shall go on to make my observations on the different senses, and to this subject I shall proceed.

The Brain may be compared to a large City acceſsible in many different ways, by canals under ground, by paſsing thro' the air, or by sailing into the harbour: The Nerves may be considered as these different modes of entry formed for the convenience of the inhabitants; & the senses constitute the difference between the inroads of the brain: they are five in number to wit, Touch, Seeing Hearing, Tasting, & Smelling, of each of which I shall proceed to treat, and 1st of

Touch. Within this sense the other four may be said to be included, & to be mere Modifications of it: Every part of the Surface of the body enjoys

this Sense; the organs of the other senses all possess the sense of touch: by it we are enabled to judge of the hardness, Softness, — Shape or figure, Size weight, heat & Coldness and many other circumstances in which natural bodies are placed. ——

We proceed to take notice of the peculiarities ~~of~~ in the organs of Touch. — 1st There is extended all over the surface of the body a membrane called the Epidermis; this membrane is not supplied with either bloodvessels or Nerves; so that it possesses neither Sensibility nor common Irritability, tho' it contracts from the application of a cold substance; — the Cuticle is of different thickness in different parts of the body, thus it is very thin on the glans penis, and very thick on the soals of the feet: The thickness does not appear incompatible with its irritability, thus tetanus results more commonly from wounds of the foot than ~~from~~ any other part, and the Sensibility is very little for the wounds excite no pain, nor does any inflamation supervene from such incisions. 2d Immediately under the Cuticle, the Rete Mucosum is situated.

This is a thin weblike mucous membrane not so readily visible in white persons as in blacks;– it is the seat of blackness in Negroes. 3d. Beneath the Rete mucosum appears the true Skin; this appears to be composed of a thick network pressed closely together; and capable of muscular contraction. 4th. Connected with the skin are a number of small glands which pour out an oily linament called Sebaceous. They pour out this linament for the purpose of defending the Skin from the action of the air; they also preserve the Skin in parts where it is exposed to much motion and friction as under the arms &c. the face being also much exposed is also covered with it. 5th. Hair, this comes out from the cellular membrane of the Skin; it is incased first in a small bulb under under the Skin; as it comes out it carries with it a cylindrical covering which appears to be an extension of the bulb, and also a covering derived from the Cuticle. They are sometimes found buried in fat in other parts of the body.

6th. The Cuticle and true Skin are not confined to the surface of the body, but are continued through the Alimentary Canal, Uterus, Penis &c. - 7th. The sense of Touch is increased by the bloodvessels which accompany the Nerves.

Lecture 8th

8th. The Cuticle somewhat altered continues to line the mouth, Fauces — Alimentary Canal, Anus, Vagina, Nostrils, &c. And hence, as I mentioned when treating on Sympathy, is the Sympathy between the Skin and Stomach explicable without supposing any connection with the Brain. ——

9th. Fullneſs of the veſsels of the Skin, according to Dr Monro, increases the Sensibility, for Sensibility of parts depends much on the quantity of blood with which it is supplied: Dr Monro raised the Skin of a Frog's leg and introduced under it a solution of Opium; the frog was affected in a very violent manner, owing to a ligature being made round the limb to prevent the return of the blood, when this was removed the Animal convulsions were not so violent. Mr Bell, treating of the cure of Aneurism, has the following observations in support of this

opinion that the sensibility of parts depends on the presence of blood in the parts" immediately after this opperation the want of feeling in the parts is often very great &c." (here followed a long quotation from Bell) One fact only appears in opposition to it; it is that the sense of Touch is increased by fasting, which must diminish the quantity of blood; so-many facts however concur to establish it that I must adopt this opinion that blood increases ~~Sensibility~~ Sensation. The lips for instance are remarkably sensible in consequence of their vascularity. —

10th. There appears to be two sets of Nerves in the organs of the senses; one for the purpose of sense, the other for common sensation; and there is often a translation of that or the proper organ of sense. Mr. John Hunter mentions an instance of a Gentleman who in consequence of a Gangrene of the glans penis which sloughed off, had the peculiar sensation of that part transfered to the end of the remaining penis. In Caro Boerhaave who was deaf the Nerves of hearing appeared to be translated all over the body. —

11th. The extreme ends of the Fingers appear to be the parts of the body which have

most of the Nerves neceſsary for the sensation of Touch appropriated to them; hence we find this part - - - - - - - - - - - - - - The Nails are perhaps designed for the defence of the finger ends; may they not act also by a kind of Reverberation? Some have aſserted that there are a kind of papilla at the finger ends which aſsist the sense of touch; these have never been demonstrated; it has been aſserted from analogy to the Tongue. Malphigi is the only one who aſserts that he's seen them. —

12th. To poſseſs the Sense of touch in the highest degree, the greatest poſsible surface is applied for the purpose of acquiring knowledge of the pulse for instance, and the more accurate will be the sensation in our minds; we should always apply 4 fingers when practicable, and never leſs than 3. For the Sense of touch to be enjoyed in perfection, it is neceſsary that the brain be free from preſsure and in a state of quiet; the circulation of the blood should be perfect neither too quick nor too Slow, but at the natural Standard, the effects of the blood having been already Stated; the temperature of the fingers Should be neither too hot nor too Cold; the Nerves of the part Should not be preſsed; the Cuticle

should not be too thick; the thickness of the cuticle detracts much from this sense; we see Smiths who every day burn their fingers, have the cuticle so calous that they enjoy the use of this sense very imperfectly: The functions of the other senses should be suspended; this I mentioned should be done with respect to hearing & seeing when we feel the pulse of our patients, the influence of it is very great: Mr Boyle mentions an instance of a Gentleman who being perfectly blind could distinguish Colours by the sense of touch; in dry weather his perceptions in this way were more acute, he could distinguish the the black letters of a book. ——

By the touch we acquire all our Ideas of the primary qualities, if I may so call them, of natural objects, as hardness, softness, figure, Extension, (Motion) &c. &c. Our Ideas of some of these it may be immagined, we acquire from other senses as the Eyes of figure; from the connected use of the Senses it is difficult to ascertain precisely whether this be the case or not. I believe however that the sense of touch is the most probable; - without the sense of touch we would be able to make no

distinction between the rosey colour of the cheek and a flame of fire: — An intimate friend of the celebrated Mr Locke — Molineax, asked Mr Locke the following question — Do you suppose if a Child were born blind and his fingers were placed first on a Cubic piece of Matter, and then on a Sphere, so that he examined these as well as he was able by the Sense of touch, and that he was suddenly restored to Sight, would he, if the Cube and Sphere were placed before his Eyes, be able to distinguish the Sphere and Cube? Mr Locke candidly confessed his inability to answer it: And if, Gentlemen, this great Philosopher could not solve this question, I am sure you will excuse my attempting to determine whether our Ideas of figure Magnitude &c. are acquired by touch or Sight. This Sense gives Man a decided Superiority over the brute Creation; the other four senses they possess in common with him. It is probably the want of it which makes the Horse ignorant of the powers which certain substances possess which scare him. Of the pleasures of which we derive from this Sense I shall speak when we have concluded our

our account of the other senses. I proceed next to Taste. The organ of this sense is the Tongue: 1st It is confined to the end and edges of the tongue, the root and upper surface not possessing this sensation when sapid bodies are applied to it: this observation which was first made by Boerhaave and confirmed by . . . . I am pretty convinced of from repeated experiments. 2d. The nerves which are appropriated to this ~~taste~~ sense end in the papillae which Anatomists describe on the tongue; they are derived from the 5th pair, the 3d branch I believe is the one by which the sensation of taste is perceived; the other branches give it common sensation and are spent upon the other parts of the mouth and Fauces — 3d. These papillae of the tongue I believe to be glandular; they secrete a mucous which covers the tongue and preserves its sensation more acute; when this is accumulated it thickens on the tongue as in fever, and differs in colour as yellowish sometimes, and now and then brown and black; the furred tongue so common in febrile diseases you must all have seen: it is in consequence of the secretion of this mucous about other parts of the mouth that persons are able

to put candles into their mouths without burning themselves. 4th The tongue possesses the sense of Touch in an inferior degree; tho' in one respect, that of temperature, we can judge better by it than by the fingers; thus women tell whether Eggs be fresh or stale by placing their tongue to the large end of the Egg; and if it feel warm the egg is fresh and vice versa. 5th The sense of taste differs in accuracy with age; it is most acute in Children hence they are pleased with the sapidity of Sugar, which to old people is not so pleasing, as it is not sufficiently stimulating to excite pleasing sensations in the latter, hence they are most pleased with highly seasoned victuals with aromatic Substances &c. 6th All tastes are affected by the solution of the sapid body on the tongue, if the tongue be dry no taste is perceived. 7th Temperature has an influence on taste, coffee loses its relish if a hot day, and Mellons in cold weather are not pleasant. 8th There are certain tastes which never vary, thus Bile is bitter to all tastes; acids are universally sour, and any food taken after bile tastes bitter, after acids sour &c. 9th When the skin is eroded

from the tongue we acquire erroneous Ideas of taste from the increased Sensibility of the tongue. 10th Cold has a great influence in destroying the sapidity of bodies; a certain Noble traveller says that in travelling to the peak of Teneriffe the cold destroyed in his tongue the power of tasteing. 11th Taste like the other Senses may be transfered from the Tongue; Mr. Jape relates a case of a girl who by accident lost her tongue but could taste accurately with other parts of her Mouth. 12th Taste is one of the most accurate of our Sensations, the Ideas acquired from it are very exact: Madeira wine merchants poſseſs in general very exact tastes; I knew one formerly in this city who could tell the parish in which the wine was made in Madeira; the peculiar wine of every parish in that place he distinguished with the utmost accuracy; another gentleman who had been accustomed to drink Madeira could tell with accuracy what had been bottled and what had been taken from a cask. ——

How shall we account for the difference of taste? Baker is of opinion that taste arises from the application of Specific stimuli of Salts to the tongue. Reed thinks

that by an union ~~with~~ of the sapid body with the mucous and fluids of the mouth a Tertium Quid is produced, and thinks the great diversity of tastes may be better explained in this way. Taste is by no means an independent Sense, it depends much on the Nose and Eyes; I had no Idea of the influence of the latter on taste till I knew of a wager won by a person who asserted that Mutton & beef dressed in the same manner would be indistinguishable to a person who ate each blindfolded, the fact turned out to be so and he won his wager. The influence of Smell on it is very great, as you must all agree.

The *use* of this ~~taste~~ Sense is to shew us those aliments proper to be ~~ate~~ eat & direct us in the choice of them, for very few aliments are pleasant which are unwholesome. Are there a certain number of primitive tastes as of original Colours? I answer that I believe there are, and that all the different tastes of sapid bodies are modifications of them; my reasons for this opinion you will find in my first Volume of Medical enquiries and Observations. ——

Smelling, is performed by the impressions of odorous bodies on our nostrils, with

with which I would include the surface of the Oſsa Spongiosa inferiora, Os Ethmoides — Septum Narium &c. &c. tho' I exclude entirely those cavities which are said by Anatomists to aſsist this proceſs, as those of the Frontal Sinus, Sinus Sphenoidalis, Antrum Maxillare &c; and my reasons for this exclusion are, 1st if this were the case that the different cavities above ennumerated do aſsist us in smelling, and the different extent of the Schneiderian Membrane, smelling would be more acute in proportion to the size of the animal. 2d All animals of the same size have not the sense of smelling in the same perfection. 3d All these — sinuses open in a manner unfavourable to smelling, viz. behind or backward. So that in inspiration the air could not readily paſs into them. 4th The moisture with which they are covered and filled as it were would be — injurious to acute smelling, as it would prevent the close application of the odorous body. Heat and moisture are neceſsary for the sense of smelling; if a person be very cold he enjoys this sense very imperfectly; if the nose be not moist we cannot smell to any advantage. The Schneiderian Membrane

is plentifully supplied with nerves and bloodvessels the vessels are very slender as is proven by the ease with which hemorrhagies are excited there. Inspiration thro' the Nose is necessary for smelling; the Nose is thus made a Centinel to warn us of dangers to which we are exposed from putrid effluvia &c. Smelling is not a perfectly independent Sense, taste is closely connected with it as are also the Eyes, hence the tears which are shed from any stimulating odours; also in Sneezing the Eyes are affected: it derives from taste much assistance; the wine Merchants whom I just mentioned could tell the wine of every parish of Madeira only thro' combination of smell and taste. This sense like the others from repetition changes the impressions of odourous bodies which were at first unpleasant to the agreeable as tobacco. – The taste of most pleasantly smelling substances is disagreeable; thus the damask Rose is very unpleasant, the pink is bitter. The minuteness of the odorous particles of bodies are almost infinite, one drop of the oil of damask Roses dropped into a pint of Olive oil gives it a very strong odour which lasts and adheres to

it for many years: The smell of a Skunk will pervade sometimes a Whole township I have had the smell of a putrid Whale which I was looking at adhere to my clothes for a long time: Birds are able to smell Carrion at the distance of many hundred miles. The smell of the spices about the Islands of Sumatra and Ceylon are distinctly perceivable 40 miles at Sea. Eagles and Vultures smell their food at so great a distance from the Earth that their Eyes can certainly be of no use to them: Elephants possess the sense of smelling in a very acute degree, the whole of his proboscis is an expansion of Olfactory nerve; one of these animals it is said distinguished by the smell (with his proboscis) a piece of money which had been in his masters pocket from among a large number of other Coins: Whith what exactness will a hound learn his masters footsteps by the acuteness of his smelling: they have their Ossa Spongiosa very large for the purpose of extending the Schneiderian membrane. It is said of a boy who was brought up in a forest that he possessed

the power of smelling to such a degree that when married he could follow his wife at a considerable distance by her perspiration, so that the human species are not always destitute of a most acute sense of smelling an instance of the kind has occurred in the United States; - a young man by the name of Henry Smith in Northampton County Pensylvania can distinguish his brother 20 miles off by his perspiration. A French gentleman in the year 1796 requested of Dr Pascalis a physician of respectability in this City, to allow him to see one of his patients in the yellow Fever, Dr P. — introduced him to one of the sick rooms and he could ever distinguish yellow fever afterwards by smelling; indeed by — passing houses where the sick were, he could distinguish if the disease was malignant bilious Fever. The Brahmins we are told who live on a vegetable diet, have their sense of smelling so much increased by this means that they can readily distinguish by his perspiration a person who eats meat from one who lives on a vegetable diet.

The first use of ~~his~~ smelling is

to warm the air be breath before it enters the lungs; hence it is a useful practice for persons exposed to the cold to put a handkerchief into their mouth and breathe altogether thro' their nostrils: Another use of it is, as we before observed, to direct in the choice of aliments, and to guard us from dangerous effluvia. Are there certain primative Odours as there are Colours? I answer I believe there are, and that all the ~~smells~~ various smells are modifications of a certain number of different original ones. Translations of this sense have occured; Dr. Haller in ~~the~~ 3d. volume of his Bibliotheca Medicina Practica mentions a case quoted from Theodosius Maſon where the sense of smelling was translated to the stomach. Many medicines might perhaps be applied to the Nose; we lose frequently the effect of many medicines by giving them in pills instead of solution, as the taste and smell are disguised: Many odours please us in small quantities which disgust us in excess; Musk for instance in small quantity gives our clothes a pleasant smell, but a greater quantity is extremely unpleasant: A

a small quantity of Assafetida on a beef steak is an improvement, but how disgusting a substance it is in any quantity you all know. Many persons have been desirous of introducing into the number of tastes the insipid, and of odours, the inodorous; but this depends on an absence of taste and — odour, and is a foolish addition and ought to be rejected. Smelling an unpleasant odour renders us more susceptible of pleasure from a fragrant one; as for instance the smell of a Rose is improved by smelling Assafetida before it; in this Smelling differs materially from Taste, as after tasting a bitter Substance, the next substance you taste partakes of that quality.

Lecture 9th

Of the Sense of Seeing.

Seeing is the next Sense in order. To do justice to this subject would require a whole course of Lectures. Of all the writers on Philosophy none have neglected to treat of Vision. I shall take notice of such parts of the subject as are necessary for Medical Students to Know. The diseases of these organs of this Sense compose an interesting part of Pathology. It is perhaps one of the most important Senses. Nature has entrusted the other two Senses, first treated of (Tasteing & Smelling) to one particular organ, but the organs of seeing are ~~always~~ double there are always two Eyes unless by accident one be destroyed; Some animals have more, some 4, 6, and some Insects have 8 Eyes, never an odd number, either 2, 4, 6 or 8. The Eyes the organs of vision you all know are placed in that part of the body the best adapted to the functions they are to perform, viz. the Superior

superior part of the face: They are defended by the bony sockets in which they are incased, more-especially by the Supercillia from external violence, by the eyelashes from dust and Insects floating in the air; by the Eyelids we are able to prevent the excessive stimulus of light; the Eyelids are of great use to the Eye, preserving its moisture &c. These each consist of 6 coats, 1st the common cuticular covering. 2d A lamen of the true Skin,- 3d Cellular membrane; 4th A muscular expansion. 5th A Stratum of papilla 6th A fine membranous covering next the Eye, very sensible and plentifully supplied with bloodvessels. The muscles of the Eyelids enable them to move so as to cover completely the Eye, and again to uncover it, in this way serving to lubricate it.- There are about the Eyelids a number of Glands, which secrete, some of them an aqueous, and some an oily fluid; both however, serving to lubricate the parts, and render the Cornea or rather preserve its transparent: Beneath these the Eye is situate, it is composed of 6 Coats to wit, the Conjunctiva or Adnata: 2d The Sclerotica. 3d The Choroides. 4th the Cornea. 5th the Iris or Uvea, and 6th the Retina: You see Gentlemen, I adopt the old division.- The Cornea is the most convex transparent part

coat of the Eye, situate at the anterior part of it. The Sclerotica has been supposed to be a continuation of the brain which accompany the Optic Nerve in its exit from the Skull: this I doubt; the Pia Mater may be blended with it: The Cornea was formerly supposed to be a continuation of the Sclerotica, but Haller has proven that it is a distinct membrane, which may be sepparated by digestion in water till putrefaction comes on; it is composed of a number of Laminae or plates of a tough firm consistance. The Cornea does not appear to be supplied with vessels which carry red blood; that Nerves exist in it is proven from its Irritability and Sensibility. The Choroides Coat is under the Sclerotica which extends from the Optic Nerve to the Ciliary band, at the place the Iris commences. A black pigment is applied all over the Ciliary band, and commonly on the Choroides, hence the pupil is of this colour; this effects a contrary purpose from what a Mirror is intened to do, the one for the purpose of Reflecting, the other for the purpose of abstracting or Suffocating the Rays of Light.

The Retina is a mere expanded continuation of the ~~Optic Nerve~~ Medullary substance of the

Optic Nerve which is Spread over the Choroides Coat and is the immediate Seat of Vision: It is supplied with bloodvessels which probably render it more Sensible, hence those animals which have Red pupils are very Sensible to the light, and cannot bear the Stimulus of intense light.

Next of the humors; there are three, the Aqueous, the Chrystalline, and the Vitreous; the Aqueous occupies all the anterior chamber of the Eye, it is of as fluid a consistance as water: The Chrystalline humor should be more properly called Lens, as it is of such a density as to preserve ~~the~~ a lenticular form; no blood vessels enter its Substance. The Vitrious occupies all the posterior Chamber of the Eye, is of a denser consistance than the Aqueous. The Chrystalline Lens is most convex at its posterior Surface, it is composed of fibers or laminae or Scales; the central ones of which are firmest, and the most fluid external, perfectly pellucid; hence we must see that all experiments made with glasses must differ from the truth in the different refractions of it from the Substance of the Chrystalline lens: the lens throws the Rays further back by this Reason than the glass could do.

The Aqueous fluid is about the consistance of water coagulates by Spirit of wine; the use is, to defend the Chrystalline lens from injuries which may happen to the Eye, also to preserve the pellucictity of the Cornea. — the rays of light before they enter the Chrystalline lens. —

Having thus made a few observations on the Structure of the parts in vision, I shall proceed to some preliminary remarks on Light before we attack the subject of vision. —

Light I believe to be the finest of all Material fluids; it does not pass immediately from the Sun as has been supposed, but exists in every part of the Solar System, and requires only the presence of the Sun to put it in Motion. Fine as is the Matter of light, it has not escaped analysis; for this we are indebted to Sir Isaac Newton, he has divided it into 7 different parts or Rays; the colour of these rays are Red, Orange, Yellow, Green, Blue, Indigo, Violet; to remember the order of these Gentlemen, you may reverse the Initial letters of each of these Colours, and the word vibgyor is the result. —

A lively Eye shews a quick turn of mind, and a dull one vice versa.

Colour is mere quality of Matter depending on the power of Substances to reflect different Rays of Light; it gives the Idea of whiteness when a body reflects all the Rays of light. When it absorbs them all black colour; when it suffers all to pass thro' it without any change (as to colour) it is said to be transparent, and opaque if it does not.— Red is the most Refrangible Ray, and Violet the least so. All the different variety of colours in Nature are modifications of these 7 primitive Rays: The angle of Incidence in Rays of light is always equal to the angle of Reflection. Light suffers a different degree of Reflection from the different density of Medium;— thus, light in passing from Air into Water is reflected to the perpendicular; and in passing from water to air from the perpendicular direction. Refraction means when a Ray of light undergoes an alteration from its straight course in the manner first mentioned. Rays of light undergo a great change in passing thro' a transparent body of a convex or concave form; in the first they are collected into a focus at a certain distance from the convex body; in the latter they diverge or are scattered so as to occupy a greater space; hence the use of the

Chrystalline Lens. ——

Having made a few remarks on the nature and properties of Light I proceed to treat of Vision; and the Theory which I have adopted I hope you will easily comprehend.— All the rays of light coming from the body at which we look, pass the Cornea & Aqueous humor, when they undergo a Refraction in this Medium and are turned rather nearer to their real axis, — unless such as strike the Eye at an angle greater than 40°. They next undergo a still greater refraction in the Chrystalline Lens, and are converged to a focus on the Retina; though before they arrive get here it is probable they undergo some change by passing thro' the Vitrious humor. The Pigmentum Nigrum spread on the Ciliary processes, is for the purpose of Suffocating as it were, the rays of light when they are too intense. The Image then of the object at which we look is painted on the Retina which is the immediate seat of vision; and not the Choroides as some have asserted: This I infer from variety perceivable in the Tunica Choroidea in many animals, and the unchangeableness of the Retina which is always alike in all animals which have Vision: the Retina too is almost ~~always~~

entirely Nervous, the Choroidea on the other hand, possesses no sensibility: the minute Ramification of Arteries in the Retina and the want of vascularity in the Choroidea affords another argument in favour of the opinion. When the Cornea of the Eye and the globe of the Eye generally, is too flat, the disease is called Presbyops; when on the other hand it is too Convex, the disease is called Myopes is produced; in the first the Rays of light are converged before they reach the Retina, & the focus falls perhaps a quarter of an Inch before it in the Vitrious Humour; - In the latter the Rays converge behind the Retina, in both cases vision is indistinct: The remedies for the former is a double concave glass, or viewing objects at a distance from the Eye; - that for the latter is a Convex glass or viewing objects nearer. Vision may be said to be, perfect when we read easily, a book at the distance of a foot from the Eye, which is about the prosproper distance. The contraction of the pupil has an influence on the appearance of objects: in viewing distant objects the pupil is always more contracted than viewing objects near us. The contraction of the pupil is caused

also by the Stimulus of Light; if a person comes out of a dark room into a light one the contraction of the pupil is very evident, and Vice versa. Dr. Monro mentions two cases of Hydrocephalus Internus, in which the contrary of this was H observable, the patients pupils contracted in darkness & dilated in the Light. These are the only instances of the kind of which I have ever read or heard. The influence which diseases of the Brain have on the pupils of the Eye, will be taken notice of in another place. Some Animals see best in a very strong light, and others in a more moderate degree of it: Man sees best at about the light of day in a shady place. The sudden impression of too great a glare of light, and the sudden abstraction of it are detrimental to vision:- habit renders us able to see in places that were dark at our first entrance thus we read of persons confined in a Dungeon, being able to read where at first they were not able to distinguish the largest objects in the room. I said sudden impressions or abstractions are both hurtful to vision,- hence the light comes gradual in the Morning and departs slowly in the Evening; so that

So that we do not observe any ill effects from it. The influence of the mind on the contraction of the pupils obtains in other animals than man. The Parrot expresses its passions by the contraction and dilatation of the pupils. The colour of the Iris varies in different Nations as they are more Southern, in which it is brown and black; in Nations situated more notherly they are grey and blue; this is a wise provision in Nature, as the intensity of Southern light is rendered less by the Rays being suffocated by the black and brown Iris: This obtains all over the Globe unless the Indians of North-america be an exception; they have black Irises: but I much doubt if they be aborigines of the middle States; I rather think they migrated from South America, and if so, our position holds good. Till we can ascertain that the Esquimaux Indians have black Irises, we need not doubt but this is the case.

Philosophers have proven that all objects viewed, are painted on the Retiana in an inverted position; how is it then that we see them in their proper position? The general way of answering this question is, from the influence of habit; I deny its influence on the present occasion; for

for persons who have had cataracts from their birth and been cured of them are restored to sight in their mature years, see things in their propper position before habit could have had any influence. The only way in which I can explain the fact is, that the mind follows the Rays of light as they proceed from the object; thus the mind will follow the Ray which comes from the top of the object tho' it is painted on the inferior part of the Retina, and vice versa.

Since we have two Eyes, and consequently two Retinae, and since we must have one Image painted on each, why do we not see the two, or why ~~[illegible]~~ have we not double vision? This question has been answered in the same manner as the last, by the influence of habit; but this answer is to me unsatisfactory: The manner in which I think we see but one object is, that two impression of equal force acting at the same time produce but one sensation in the mind; both the impressions on the Retina are Synchronous and of course but one Idea arises in the mind: Thus Insects which have eight Eyes have but one Sensation from the sight: One Eye perhaps gives us as

accurate a sensation as two, tho according to some philosophers we are one tenth better with two than one: I know that vision is not so accurate with one Eye as with two: I well recollect a serious accident that had nearly occured from this circumstance while at School; some of my School mates were acting a play, in which it was necessary for one to plung a Sword into the bosome of the other, or at least to give the Spectators that Idea; he had but one Eye;. he drew the Sword, & from not seeing well the position of his friend, thrust the weapon in such a manner as to tear his clothes, and slightly wounded him. ——

From what has been said on the subject of Light, Colours & Vision we will be enabled to answer the following queries,- Why are some animals able to see in nearly a dark room, as Bats, Owls &c. from a large dilated pupil which allows the greatest possible number of the rays of light which exist in the place to enter the Eye; and from an exquisitely sensible Retina, since we see such animals feel pain in a light place from the Stimulus of light on the Retina. Why do we feel pain in

coming from a dark Room to a light one? — this question was just answered, Viz. by our Retina being made more sensible to the action of the Stimulus of Light by being deprived of it. Why does the Eye look appear soft and languishing after looking a long time at a black object? because the black object reflects no Rays of light to stimulate the pupil to contraction, of course it dilates and gives the Eye that appearance. Why is the Earth clothed with Green, and why are the principle vegitable productions which salute the Eye of that colour? because Green is the colour which is exactly middle way between the extremes of most Refrangible and least Refrangible Rays. If it were—covered with Red our Eyes would not be able to bear so great a Stimulus; and violet on the otherhand, would not be sufficiently Stimulant; green is middleway between the two, being in the middle of the word vibgyor.

I shall conclude the consideration of this sense by a few directions for the preservation of the blessings we enjoy thro' the medium of this sense, and cautions against the abuse of it. 1st. Never keep the muscles of the Eye on the Stretch in Reading

as is done by lying on the back; they then support the Eye entirely; this is a common practice while Reading lying in bed on our backs; it is a bad custom and ought to be laid aside; it is perhaps equally injurious to look perpendicularly downwards on a book: We should read or write on desks which slant or slope as those used by Merchants, Students and philosophers use them less than they ought to.

to 2d Receive the light whenever it is perpendicular, from behind you, so that it may fall on your back before it falls on your Eyes; we are often in our own light when we attempt this, but it may be made to come obliquely over our shoulders without this inconvenience: on books printed on very white paper admit the light sideways.—

3d In washing your face avoid pressing your Eye balls, as it flattens them very much if the pressure be frequently repeated; hence many persons I am convinced become *Presbytae*, and the Eyes can very readily be washed without any pressure being made on them.—

4th Combing of black hair over our forehead is of use in suppressing some of the Rays of light before they arrive at the Eye.

The Bat discovers his situation as to place by the sound of his wings, hence when the hearing is destroyed he flies against the wall.

5th The early use of Spectacles I am certain is proper and highly useful to all who have the smallest degree of weakness in the Eyes. A desire of being thought too young for this has been the cause of many inconveniencies to ~~many~~ different people; you may frequently be able to lay them aside as you advance in years: I have known many cases of this kind where the persons have been able to see perfectly well without the use of Spectacles, after having used them for a long time. Lastly, Reading by candle light late at night; the candle light in the morning is not so hurtful as evening. A Lawyer in this City was cured of obstinate Ophthalmia by reading early in the morning instead of evening. —

Of the pleasures derived from the sense of seeing, I shall speak after having concluded the subject of the remaining Sense. Its Uses are so obvious that to point them out would be an insult to your understanding. It has a preeminence over all the other Senses. Mr Reid has emphatically called it "the evidence of Reason" (here follows a long quotation from Reid on the Mind and on Vision) After considering the advantages derived from the Eye, he concludes by stiling it "the Mirror of

of the Soul, the master piece of Nature"

While I was attending a course of lectures on Anatomy by Dr Monro in Edinburgh I recollect an old gentleman who was present at the demonstration of the manner in which the Perforatus Tendon is perforated by the Perforans; he informed me that he had laid awake the whole night with the window of his chamber open so as to admit the light of the Moon, and amuse himself by opening and shutting his hands: If so trifling a piece of Mechanism as as this comparitively is, could excite such devout contemplation in the mind of this old man; the Structure, functions and Mechanism of the Eye should be sufficient to keep him awake to all Eternity.

Hearing. before entering on the consideration of hearing, I must make a few observations on the nature of Sound, and 2d. on the Structure of the organs of hearing to wit, the Ear.

1st. Of Sound; Sound is emitted from the percussion or collision of solid elastic bodies, and propagated by tremors or corresponding vibrations in the air.

X from concuſsion from canon & other fire arms.

Before the battle of Princeton a British officer a little distance from the main body came up to the commanding Officer and told him that he thought the Rebel army not far off; a Silence was commanded on pain of Death thro the whole Army.~

Sound may be divided into Noise and Sound properly so called: Noise is a coarse harsh sound in which the tremors are not numerous, as in the explosion of Gunpowder &c. The Air is not the only medium calculated for the propagation of sound, the Earth and water also answer this purpose; that the Earth does tremble or vibrate in consequence of loud sounds, I have not the least hesitation in asserting; When I acted as Surgeon in the American Army during the Revolutionary War, a curious fact which I was then at a loss to explain occurred to my notice at the battle of Brandywine; — I was standing on a field, and a severe and heavy Cannonading commenced a short — distance off; of a sudden the Eart — under my feet became invisible, and a cloud of dust arose to the height of 3 or 4 feet of such a density that no object could be seen through it at the distance of 12 feet; — This I can now readily explain by the tremulation[x] of the Earth: Another fact puts the matter, in my mind, beyond all doubt; — A Soldier at Easton in this State while the British were at Mud Island, a place 8 miles below this city, and Easton

70 miles above it, heard distinctly the ceſsation of Cannonading; by applying the handle of his Knife to his Ear and thrusting the blade in the ground, pronounced one day that Philadelphia was taken for the cannonading had ceased, the Report in a few days proved this aſsertion to be true. — Water we prove to be a vehicle of Noise by striking Stones together under water, the noise is propagated as well as on water; — Divers can hear the approach of a Ship, before it can be seen.

We prove that in Sounds there is a tremulation of the body by observing what takes place in a Bell when it is struck with a hammer; here the Bell changes its form entirely from the circular to the Eliptical & and Vice Versa very frequently. — 1st. Elasticity favours greatly the property of sounding; thus braſs and Silver are much more Sonorous than lead and Gold. 2d. Tension, if a chord is the Sonorous body is indispensible to the creation of Sounds — thus the String of a Violin will not emit sounds unleſs tense. 3d. Collision of Solid bodies whether Elastic or not emit Sounds, if the body is elastic the sounds are compound if non elastic, Simple. —

Sounds are either acute or grave: — Nature has fixed no limits between Acute and grave Sounds; the number of vibrations is is the only difference, the graver the sound, — the fewer is the vibrations in a moment, Some musical philosophers have fixed a line of distinction between acute and Grave sounds; when there are about 30 vibrations or any leſs number of vibrations in a moment, the sound is said to be grave, but any greater number of vibrations characterize an acute Sound: In the most acute Sound, there are supposed by Mr Euler to be 7520 vibrations in a Second of time: The difference between the least acute Sound & some grave tones is scarcely perceptible but to the nicest Ear. Monsieur Sauveaur has proven in a diſsertation lately published by him, that a chord which emits a definite limited number of vibrations in a Second, may be made to emit 72 times greater a number without altering the acuteneſs or Gravity of the tones perceptably. Loud Sounds are more apt to force surrounding bodies into corresponding tremors than low ones; thus Canon when discharged agitate the ground & break windows,

and thus Church Organs are known to make the walls move.

The following circumstances influence sound in chorded Instruments. viz. the length, hardness and softness, Elasticity, figure — thinness, & thickness of bodies, also the tension of the Matter. 2d Chords of the same quality of Matter Ceteris paribus, yield acute Sounds in proportion to their tension, that is, the more tense the chord, the more acute the sound is, and vice versa. Galileus made the following curious experiment; he placed a tumbler of water on a table, and by means of a Violin near the tumbler, caused different sounds to be emited; with these the tumbler was moved in such a manner that the water in the glass was soon undulated at the surface, and with every sound of the instrument when the tone was raised an octave the waves trembled perceptably quicker & vice versa. This experiment proves that acute sounds have more vibrations than grave ones. Length of the Chords in chorded Instruments increases the gravity of sounds emitted from them; thus two chords equal in every respect but length, will emit sounds, when tense and struck with a solid body, of different degrees of gravity

gravity in proportion to the length; the short string, if of half the length of the long one - will emit a sound exactly twice as acute. - Tension is a matter of the utmost consequence in chorded Instruments; the sounds are also acute in proportion to ~~the~~ tension ceteris paribus, and to the manner in which they are struck. ——

Consonance in Music~~al~~ ~~Instruments~~ is when two musical Instruments are under such circumstances as that both perform the same number of vibrations in a given time, also where one of them performs two Octaves more than the other; thus if the chord A be one foot in length and the chord B two feet or twice as long as A, and if A be made to perform ½ the vibrations in the same time as B, these are said to be in Unison or Consonance with each other. -

2d. -

. . . .

3d. A fifth is when the chord A is to the chord B as 3 to 2. - A fourth when A is to B as 4 to 3.

5th A greater third when A is to B as 5 to 4. - A lesser third when A is to B as 5 to 7. -

Symphony in music is when . . . .

thus a musical Instrument is in unison with ~~the~~ a human voice, and a Bagpipe with a Kettle drum. — The sounds which results from collision of two hard bodies substances are propagated along many solid substances; — thus the filing of Iron or the scraping of glass will produce such a vibration in the teeth as to the sensation we express by saying — they are "on edge"; hence horses are known to tremble with the sound of carriages passing before them; hence also a Ladies voice — frequently causes corresponding tremors in a glass tumbler. The walls of Jerico were said to have fallen from the sound of a Conk Shell, this is the only way in which that fact is explicable, but this is not done without the presence of air I am persuaded, in all the above instances: No sound is emitted from a bell in vacuo when struck with a hammer: A pistol we are told cannot be heard when fired from the top of the peak of Teneriffe. — The progress of sound is very rapid, it travels along the air with great celerity (to wit, 1142 feet in a second (Philosophers

Philosophers have estimated the distance of Thunder by this means. Some Substances are possessed of a power of destroying that power which certain bodies possess of emitting sound; Snow on the ground prevents our hearing the rolling of carriages: Tallow on the String of a Violin prevents its emitting any sound: Curtains & furniture in a room prevent the sound of a voice or Instrument to a certain degree. The famous blind philosopher Dr Moyer could tell by hearing his foot steps in a room whether or no it was furnished. —

Sound like Light is capable of reflexion, and the angle of Incidence & Reflection as in light are equal; – Instances of this are seen ~~by~~ in blowing into a Spiral solid vessel as a Conk Shell: Speaking trumpets act only by giving a sound a straight direction. – Echo is sound reflected, the angle of insidence in sound as in light is equal to that of reflexion: Echo at 63 feet distance is one sylable perfectly pronounced; it differs little from the original sound if it be reflected from a hard body of great size as a Rock: At the distance of 63 or 64 feet I said one syllable is echoed; at 127 feet two; at 190 feet 3 syllables, at a greater distance than 190 feet words of

almost any number of syllables will be echoed.

Having thus stated my observations on sound, its nature and general properties. I shall proceed to treat of the structure of the organs of hearing and the manner in which it is performed. – this shall be the subject of our next Lecture.

Lecture 10th

The structure of the Ear is the next subject for our consideration. The Ear has been divided by Anatomists into two parts, the internal and the external Ear: the form and nature of the external is familiar to you all. Its different parts have received several names which are not interesting, as the helix, Antihelix, Tragus, Antitragus &c. &c. The treatment our Ears receive when we are Infants contributes to render them flat; those of the Indians and other savage nations who do not wear Caps, are more prominent; & this I believe to be a principle cause of their superiority over us in point of hearing, hence they have the advantage over us in the Chase and in war. The flatness of our Ears may be remedied by raising them with our hands when a person addresses us. Dr. Franklin relates a case of a Gentleman who conquered a partial deafness in this way by raising the helix. The use of the External

H Of a Student of Medicine who attended the College of Edinburgh.

Ear is to collect and reflect the sounds; for this the Cartilaginous substance of which it is composed, and its figure with rings about it are well calculated. Some animals are capable of moving the Ear by means of muscles with very great quickness and facility; it assists them very much in hearing;- The ease with which we move our heads renders it unnecessary in Men. Instances have been known of men possessing the power of moving their Ears: Dr Monro mentions a case of this Kind.* The Ear is covered with cuticle externally, under which is the true Skin and Cartilege: between the cutis and Cartilaginous portion of the Ear is a portion of cellular membrane; this Skin is continued into the Meatus Auditorious or external orrifice of the Ear; in this part a great number of glands are situated, between the Cutis & Cuticle, which secrete a quantity of wax - whose use is to defend the Ear from the approach of Insects and dirt. The Meatus Auditorius is a funnel shaped canal extending into the temporis which leads to the cavity of the Ear The Cavity is situated in the pars petrosum of the Temporal bones, a portion so called from its hardness, being one hundred times harder

than anyother bone in the body: I said the Meatus communicates with this, I mean in the bone; the membrana Tympani divides it in the Recent Subject; this membrana tympani is situated in an oblique direction about an Inch from the external orifice of the meatus; it is situate in a direction slanting with respect to perpendicularity, its superior part being anterior, and it slants also sideways. — The External Ear in different Animals for their accommodation; thus the Ear of the Owl who views its prey from above downwards, can hear distinctly the sounds by means of the horizontal direction of the Ear which looks as it were downwards. The Fox whose prey is generally before him, has his Ears directed forward: The Pole Cat on the other hand, whose terror is to be dreaded "a tergo", has his Ears directed posteriorly: — this is also the case with the Hare whose enemies always come from behind. The membrana Tympani just now mentioned, is an oval membrane extremely thin, but is divided into six lamellae! is extended across the meatus and is very tense like the head of a drum; it prevents all communication from without; this has been denied, and as a proof that there

does exist a communication, the fact that tobacco smoke can by some be discharged from the mouth by means of the Eustachian Tube thro' the Ear has been urged; but this can only be done by such persons as have ruptured this membrane: They urge also that persons can hear with this Membrane ruptured, this fact is mentioned by Dr Monro; it serves only to prove the beautiful provision of the great author of Nature against the destruction of one of the most noble of our Senses. –

The Second part, or Cavity of the Tympanum is situated behind the Membrana Tympani formed in the Os Petrosum; in it are two holes denominated, the one Fenestra Ovalis, and the other Fenestra Rotunda. – between these Fenestrae is a protuberance called the Promentarium. It has been said with probability by some that the Fenestra Ovalis is calculated for the reception of compound, the fenestra Rotunda for the reception of simple sounds. The Eustachian Tube or duct leading from the back part of the fauces to the Ear, communicates with this cavity of the Tympanum. – This is lined with the continuation of the Pituitary membrane; this tube is always open; the use of this

The Membrana Tympani Regulates the Sounds.

communication with the mouth is for the constant admision of fresh air to the cavity of the Tympanum which is necessary for hearing, as the air will suffer by remaining in the cavity, an alteration in its moisture and dryness, density and rarity; hence we explain the partial loss of hearing in violent colds, and in cases of Lues in which matter gets into the Eustachian Tube. It has been said that the Eustachian Tube affords passage for sound thro' the Mouth, but this I deny to be a fact: If a watch is put into your mouth and prevented from touching your teeth, no sound of the watch is heard; the teeth being in contact with the watch afford the sound. In this second division of the Ear, within the Tympanum, are contained the small bones of the Ear, to wit, the Maleus, Incus, Stapes & Os orbiculare so called from its globular figure: Mr Cheselden supposes the use of the Stapes to open and close the Fenestra Ovalis over which it is placed; All these four bones are connected together, and are moved by small muscles extending from the Maleus to the Incus . . . . is stretched the Chorda Tympani very tense. this Chorda Tympani is a Nerve derived from the Dura Matral coat of the Auditory nerve. This middle cavity of the Tympanum may be considered as the immediate seat of hearing,

and the Meatus as its Anti Chamber. —

In the third place we are to notice the Labyrinth, composed of the Semicircular Canals Cochlea and Vestibulum. 1st Behind the fenestra ovalis, lined with a fine Membrane, covered with minute Ramifications of bloodvessels & Nerves communicating with the Vestibulum, is a vessel filled with water, which comes from the transverse Sinus of the Dura Mater called "Aqua ductus Vestibuli". The next part of the labyrinth is the Cochlea, a bony substance hollow and much resembling the Shell of a Snail, — whence its name; It is lined with a Periosteum as other bones: The three Semicircular Canals also communicate with the Vestibulum; each of these is a bony tube of a Semicircular form divided into two cavities by a Middle Septum of bone called Lamina Spiralis:– The Cochlea is supplied with a vessel containing water, — which is derived from the Scala Tympani, called "Aqua Ductus Chocleae". The Cochlea is supplied with a Nerve from the portio Mollis of the 7th pair.

Le Cat, has considered the Semicircular Canals as the Seat of hearing; he considered that these are to the Ear what the Retina is to the Eye. This theory has met with no opposition; the other

parts are subservient to it; sounds are merely propagated thro' them: - That this is the end answered by the Cochlea (for that the membrane of the Tympanum and the Chord answer this purpose viz. the propagation of sounds no one doubts) I infer from the method Dionysius the Tyrant used to hear the very whispers of his prisoners; this was by making an Artificial Cochlea in the wall which increased in a remarkable degree the power of his hearing.

Next of the manner in which hearing is performed, after having given you a tedious, and I fear an uninteresting account of the Structure of the Ear, tho' I flatter myself, not a useless one. The Ear hears by the action of sounds on the Tympanum its Membrane and Chord on which sounds are propagated by Consonances, Octaves, fifths or thirds: Hearing then may be called harmonical vibrations of the Ear; hence the tension of the Chord and Membrane: Where these parts refuse, from peculiarity of Structure, to vibrate with the sounds, none of the sounds are perceptible; thus I know a Lady who could not hear Muskets discharg'd, Thunder, or the explosion of Cannon, and could distinctly hear a pin thrust thro' paper: Some people have a still more remarkable peculiarity

in these parts of the Ear, which prevents their hearing of sounds unless a particular Species of sound is combined with it: Dr Hawkins tells us that Dr Johnson could hear only when riding over Stones; he adds the case of a Gentleman who could only hear in a Room in which ~~musical Instruments~~ Vocal or Instrumental Music was performing. In Children hearing is dull from a quantity of mucous situated on the Membrana Tympani. — The parts of the Ear in Children of 5 months old are nearly as perfect in those parts, as those of adults, and suffer but little increase of size. We can now account for the reason why the fifth pair of Nerves supplies the Eye or sends some twigs to it and the parts concerned in Speech, viz. because the Ears derive assistance from the Eyes, and because the voice is so commonly employed immediately after the Ears, as in conversation. — Hearing is not an Independant sense, the Eye as I just observed, is connected with it; it is a long time before we can learn from our Ears the direction of a sound, indeed it cannot be done without the aid of the Eyes. We are apt to imagine we know the direction whence sounds proceed from Instinct; but

but this is by no means the Case; witneſs the many wrong efforts of Children to find out whence sound proceeds & hit in every poſsible direction but the right one. Dr. Reid was much alarmed, wa-king one Night with a Noise; fear caused a palpitation of the Heart so violent as to make a hard thumping noise which he mistook for the one which waked him, and he thought it proceeded from his chamber door; however, upon examination no cause of alarm being found, his terror subsided, & with it the noise whose direction he falsely supposed was from the door: Habit alone is the reason of the quickneſs of our perceptions in this respect. ——

Hearing I said was is not a distinct sense; it is indebted first to the Nose, 2d to the Eyes: 3d To the mouth with the Nose, the communication is owing to the Eustachian Tube, it requires a constant supply of fresh air from that source. To the Eyes: hence the reason why we look attentively to a person who addreſses us; but to old people the advantage thus derived is sacrificed for the greater aſsistance they derive from disposing the Ear in such a manner as to catch the most sound, hence they present a side face in conversation. ~

To the Mouth; Poets and Painters as well as Philosophers are acquainted with this connection hence they describe peoples who are anxiously intent on the words of a person, with their mouths open. Shakespear describes the Blacksmith receiving the Taylor's News, with ~~his~~ open mouth; And Leanardo de Vinci has painted a whole Vilage Congregation receiving the exhortations of their pastor with this position of their lower face. This fact you recollect is explained from the vibration of the teeth, and not from the Eustachian Tube, merely from a continuation of Substance. This continuation of substance may perhaps explain the power which Cauro Boerhaave possessed of hearing by from any part of his body. Some people are able to tell sounds by their influence on other parts than the Ears, thus a Case is related of a deaf person who could distinguish a noise by its giving him a pain in the Bowels. — Habit has much influence on this sense; if persons are accustomed to a noise they insensibly acquire a loud voice and can hear best in that noise; thus a Miller from the noise he is constantly used to, cannot speak unless in a

very loud voice, hence the vulgar if you halloo to them ask you if you think they were born in a mill. The people who live near the falls of Niagara are unable to hear when they are out of the vicinity of the noise of that Cataract: On the other hand, persons who are deaf, not hearing the sounds as loud as ~~they~~ before they became so, acquire a habit of speaking in a very low tone; from habit some persons acquire a very unpleasant voice in conversation, & this extends to public speaking; the famous Roman Orator Tiberius Gracchus used to utter his words like an old woman, from a habit he contracted of speaking so loud that his voice fell at every pause; a servant was employed to make use of a Musical Instrument, by which he regulated his voice and conquered this habit. — The passage of air thro' the mouth and Trachea is accompanied with sound, this in yawning is very evident to our Ears. In the Ears as in the Eyes our sensations would be double if they did not receive impressions of equal force; the same sound makes an impression of equal force on both Ears, hence only one sensation results.

Our Ideas of sounds or the pleasure we receive from sounds, differ at different

The first apperation of the Senses in Animal Life. 1st The sense of Touch, this begins in the mothers womb, next by the Smell of the mothers Milk.

The diminution of the Senses always follow a diminution of the Mind.—

As well might I attempt to strike Sensibility into this Desk as to periods of our lives; thus Infants are pleased with the simple sounds as knocking on a board, a bell & Rattle &c they are delighted with; as we advance in years we acquire a taste for harmony, and aged people not sufficiently excited with this require a greater Stimulus, and Melody best suits them — The objects of Taste we before observed are changed with age, stimulating food pleasing old people..

With this we finish our account of this sense, ranking next in importance to Vision, and with it the Senses in general. Le Cat considers life deprived of th as a premature Death:— Not only Physicians and Metaphysicians, but Poets and Painters have studied the Senses. — I cannot conclude this subject without repeating an observation made in my Lectures on Animal Life; that the Senses are the avenues to the Mind. without them no impressions could be made on the Mind; deprived of the Senses we should not only be lowed to the Rank of brutes, but below them, we should be mere Logs and Stones: By them we are enabled and in duty bound 1st To pay homage to the great Author of nature. 2d To enjoy them with gratitude and humility. How is the

consideration of the dependence of our enjoyment on a number of circumstances, which can be at any moment abstracted, calculated to humble the pride of Man! I heard of a Curate who, in making out an Inventory of his effects valued his Seeing and hearing at ten thousand pounds each; but the Senses are as valuable as existance. —

Before I take leave of this Subject I must take notice of the opinion of those Philosophers who would make us doubt the impressions of our Senses and persuade us they are mere Illusions of the fancy. These opinions if believed by those who Support them are only propagated by men who wish to keep the common people in ignorance, and assume to themselves a superior rank of beings, with the arbitrary privelege of thinking for all Mankind. We hear much Gentlemen of the Craft of the Church but I am persuaded much more exists among Philosophers; proofs of this opinion will strike upon in reading the writings of Hume, Helvetius, Voltair, Mirabeau Godwin and others advocates for the perfection of human Reason. — These Philosophers would deceive us and prove

It is strange this circumstance is so little attended to, thus if an Infant take a Rose he will try it by the Mouth and Nose by Instinct that we cannot trust the impressions of our senses. ——

An account of Human Reason by abstract Reflection. —— I shall endeavour to detect the falsity of their arguments under four heads. 1st They use the fallacious testimony of our Eyes, thus if I see an artificial Rose, and suppose it to be a real Rose, the deception is not in my Eyes, but I am deceived from not subjecting to the test another sense, to wit Smelling, which would correct my Ideas from my Eyes. 2d. They urge the deception of seeing with respect to Shape and figure; thus if having been used to looking at a Globe, I see a representation of one on Canvass by a skillful Artist, in which the colours are so shaded as to resemble a real Globe, I suppose this to be a real Globe, but this cannot be called a deception, for my Eyes bear testimony of the Shading and Colours very accurately; the fault here lies in my not subjecting it to the examination of another Sense, that of Touch, by which I should correct the Ideas derived from my Eyes by ascertaining that the Surface was not Spherical. 3d. Our ignorance of the Laws of Nature has afforded them another argument in favour of this Hypothesis. If, for example, a Clown seeing a Stick under water

✠ This will command your closest attention

Knowledge of the Mind is the most perfect, it consists of facts; 3d It is an intelligible

The bones of the head are not more easily dissected than the mind.

supposes it to be crooked, he is deceived from not knowing the effects of Reflection and Refraction of Light: In all these cases we Reason from the Evidence of our Senses before we have obtained all the evidence they can afford us. Quickneſs of perception arises from the power of Reasoning in this way; thus the Prophet foretelling the Meſsiah says "he shall make him of quick understanding &c. A fourth source is from diseases of the Senses, by some of which we see double, in Jaundice we see all things of one colour; this in my opinion is no argument against the evidence of our Senses in a healthy State: that disease impairs their accuracy no one will deny. No man but a Deist or an Atheist ever doubted the evidence of their Senses.

I shall dismiſs this Subject with observing that the accuracy of the Senses depends in every Instance upon their being united with (eachother and) Reason: "What God has joined together let no man put asunder". ——

I proceed next Gentlemen, to the history, operations &c. of the human Mind. This Physiologists usually call the Internal Senses. I am not singular in placing the Mind in Lectures of Physiology; it has been done by Haller, Boerhaave, Gregory &c. The Title of Internal

℞ 1st The nature of the Mind

1st Immaterial and capable of existing out of the body—

Dr Rush read an extract from Dr Ferguson on the Mind which is beautiful and Elegant.

The celebrated Mr Fox died in the full belief

Senses I formerly objected to; to compare the opperations of the Mind to those of the External Senses I thot improper; But I am now convinced that they are as Mechanical, and depend as completely on Impressions as Seeing, hearing, Tasting, Smelling ✠ or Feeling. —

In Treating of the Mind I shall & consider ✠ 1st The Faculties of the Mind and 2d. Opperations of the Mind. — This I trust will be useful, because without it, it is impossible to understand the diseases of the Mind; We Shall find it of great use in our Pathology and Practice of Physic; I shall endeavour to make it plain, Short & I hope comprehensible by you all. —

Metaphysicians as well as Physicians have made the Faculties and Opperations of the Mind the objects of their Study: Many have so confounded faculties with opperations that there are scarce two who give us the same account of them; even Dr Reid calls Reason a faculty. The first question that occurs respecting the Mind is, What is it? And of what is it composed? On this Subject there are three opinions — 1st That it is Immaterial differing from the body and all other matter. 2d That it is composed of a very & exquisitely

~~The immortality of the~~

The Immortality of the Mind depends wholly on the will of Deity; to suppose a Spirit is naturally eternal is impious. (But may not the Great Creator ~~xxxx~~ cause them to be Naturally so? C. S.)

We recoil at the Idea of living in the grave during the lapse of ages, but we will be no more than a Moment as it were, in the grave, we are insensibly, hence at the last Trump we shall rise as it were from a dying bed to Immortality. —

I am of the opinion that the Mind is Immaterial.

Subtilized Matter, connected with the body by Juxta Position, but capable of existing without it in a State of Sepperation from it: This is the opinion of Mr Law, and appears to be of Mr Locke, who thinks that only the Great Author or first cause of all things is Immaterial. 3d That the Mind is Neither material nor Immaterial but produced by impressions on the Brain; and that these impressions as certainly produce thought and the other opperations of the Mind as impression on the Retina produce Vision or Sapid bodies Taste: Some have Supposed the last opinion to be contrary to Christianity, but this is not the case in my opinion; — They say that the Soul or Mind must be Spiritual for matter is destructible, whereas the Soul is Eternal and will endure forever: This Idea of the destructibility of Matter I deny; — You may alter Matter, give it a thousand different forms, but to Anihilate one single particle is utterly impossible: However what I shall teach you on the Subject of the Mind does not interfere with either of these three opinions; you may adopt which ever you please; I consider it to be a matter of trifling

consequence. If you choose to read on the subject I refer you to the writings of Drs Priestly and Price who have had a controversy on this subject. The Materiality or Immateriality of the Soul are by nomeans inconsistant.

The only argument in favour of Materiality mentioned in Scripture is an opinion of St Paul.

Without Revelation we can have no Idea of a future State; Adam probably by Revelation, and Tradition has perpetuated the opinion of a future State; — In this way probably the Heathens derived their notions of it.

Before entering on the faculties & and apperations of the Mind I must deliver a few preliminary propositions. 1st The body and Mind mutually act on eachother as much as any one Species of matter acts on another; the Mind on the body, and the Senses as we before observed, are the avenues through which the Mind receives Impressions which excite it to action, and the apperations of the Mind are the result of these impressions. What are the apperations of the Mind? I answer, Association, Judgment & Reason. What are its Faculties? Memory,

X. Queere, where does Dr Rush get the Idea that the heart is the seat of the passions, he has before observed that the heart — possesses little Sensibility, and much Irritability, hence its action from the Stimulus of the brain blood &c &c. All the sensations we feel in the heart from the passions of Love anger &c are from the Stimulus of the brain. and are no more connected with the heart than with the Arteries and veins, or any other muscles of the body in proportion as they are acted upon by the Stimuli of the brain.

The mind says Dr R. is an Unit.

Dr R. mentions a long Theory of Dr Gall.

+. Dr Rush I suppose means that the heart is the part that is acted on in those affections of the Brain from Emotion or Passion

H.

(think it at all difficult to)

Understanding, Immagination, Will, Passions and Moral Powers including a sense of Deity and Conscience. ——

2d Proposition; that each of the faculties of the mind occupies a particular part or spot of the Brain; the brain being the seat of these faculties as the Heart is of the Passions*

3d That all the opperations are produced by impressions made on the body which excite motion in that particular spot of the brain where the opperations are performed: I have said Motion, I do not adopt the terms now in vague with some Philosophers as Oscillation &c. but carry my Ideas of Motion further perhaps than has before been done. I think if we had Microscopes of sufficient power we should be able on opening the Cranium of a person to see every thought, every Idea to be attended with Motion; whether of the Electroid fluid, or according to Hartly vibrations of matter which compose the brain cannot be ascertained and is of no consequence: Nor do I conceive of so minute Motions, when we consider that the Membrana Tympani is capable of 20,000 distinct Motions, & this is not a 10,000th part ~~the~~ size of the brain, yet each of these motions is capable of —

exciting a distinct Idea in our minds. —

The impressions on the brain arises from two classes of Stimuli External & Internal. The former as I said before are the Senses; — among the latter may be Reckoned some actions of the mind which reflected, act as Stimuli but they are of trifling consequence compared with the Senses, for without these no mind would exist. — The 4th proposition is that the perfect use of the mind depends on a certain Medium of action resulting from a particular consistence of the Matter of the brain, which appears adapted to many motions; thus in Infants it appears not to have acquired a sufficient firm consistence; in adults of middle age it is of proper consistence: Maniacs and very old people have it ~~very~~ too hard for the celerity of perfect mind, hence their torpor. —

Having delivered these general propositions, I proceed to treat of the faculties and opperations of the mind; this shall be the subject of our next Lecture

(180)

[illegible]

Gentlemen at our last lecture we [illegible] the [illegible] ations of the mind into Memory, [illegible] the [illegible] and [illegible] a Mental [illegible] the two last are [illegible] the [illegible] of [illegible] & Moral Faculty [illegible]

1 Memory is one of the most wonderful of the mental faculties. Without the other we [illegible] very partly conscious of the Phenomena [illegible] may seem just so familiar to [illegible] we should be at a loss to comprehend [illegible] comprehend the [illegible] which [illegible] as it seems to give us to conceive of Omniscience one of the attributes of Deity. Memory [illegible] and [illegible]. The [illegible] the [illegible] and [illegible] both. Memory [illegible] most of our [illegible]

Lecture 11th

Gentlemen, At our last lecture I divided the faculties of the mind into Memory, Immagination, Understanding and Will; Paſsion & Morral Faculties — The two last are subdivided into Sense of Deity, Conscience, & Morral Faculty strictly so called. —

I. Memory is one of the most wonderful of the mental faculties: without the others are uſeleſs. Dr Reid very justly observes, if the Phenomenon of memory were not so familiar to us, we should be as much at a loſs to comprehend how it were poſsible for us to know comprehend the events which occured 20 years ago, as it now is for us to conceive of *Prescience*, one of the Attributes of *Deity*. Memory is of two kinds, active, or ready, and retentive; the latter characterizes the mere schollar, and the man of *genius* poſseses both. Memory commences at a very early period of our life. Shakespear, the Phylosopher of nature, places its origin at about the third year. — Hence in his *tempest*, he makes Prospero ask his daughter Miranda who was cast on the *enchanted Island* at three years of age, whether she recollects

anything of her native country—

"By what? by any other house or person,
Of anything the *image*, tell me,
That hath kept in my remembrance.—

This faculty is very much exerted in the first years of life. Infants have much to acquire in their first years; they learn not only a language, consisting of an immense number of words; but also the *ideas* which these words convey, and the things of which they are the names: hence Dr Gregory very happily and truly asserts, that a child acquires more knowledge in the first 3 years of its life, than in 30 years afterwards. Memory distinguishes the Philosopher from the *mere* learned man. Civilization has a powerful influence on this faculty: Indians, for instance, possess it in a very limited degree. Their method of treating with their enemies, shews us an example of their limited memories. They arrange themselves in a row, when they are to hear a Speach or Treaty read, so close that they can touch each other. When one of them has heard a few words, as many as he supposes will satiate his memory, he urges his next neighbour, who repeats the same process. This is

repeated till the sermon is concluded: they then meet and club their knowledge, from which they send their answer. Some savages, we are told, have so bad a memory, that they can never count a greater number than they have fingers and toes. Helvetius even tells us of some savages incapable of counting more than three. Memory is of four distinct kinds, viz. memory of words, of Numbers, of Names, & of Ideas. Children and Players possess the memory of words to a great degree. Dr Chacome informs us of a young Corsican who repeated a discourse after having heard it but once read, which consisted of 36,000 words.

Cyrus had a most amazing memory for ~~words~~ *names*; his army consisted of 100,000 men, and he could call every man in it by his proper name.

With respect to memory for *numbers*, numerous instances are recollected where this was possessed in a most remarkable degree: among others Jedadiah Buxton and Thomas Fuller are famous for the memory of numbers. The former of these after hearing a long sermon, told the number of words it contained. The other can in his own head (to use a vulgar phrase) multiply 12 figures in 12, or any

number included.

Memory for Ideas, is by far the most useful of the four species. This is the species of memory which distinguishes the Philosopher from the *mere* man of letters. Few people poſseſs to a considerable degree all the four kinds of memory. Dr Lardner whose memory for Ideas was very accurate, forgot his own name And the celebrated Linnaeus, when he recovered from a fit of apoplexy, forgot the maiden name of his wife I know a gentleman in this country whose memory for ideas is very complete, whose memory for *words* is quite the reverse. We shall enlarge upon this when we come to treat of the diseases of memory.

Immagination is a peculiar faculty, differing from memory, 1st. because memory has relation only to the past, while immagination is unlimited as to time, past, present and future are laid open to it. 2d. Immagination has for its object, real, as well as immaginary circumstances. 3d. Memory is a warehous, a Magazine of the mind: Memory may be compared to *history*, Immagination to *painting*; or memory may be compared to a ship moved entirely by oars —

Immagination to a veſsel moved by sails and oars.- Immagination is the Pioneer to all useful discoveries in the arts and Sciences, except such as are discovered by accident; it is gentlemen, a Christopher Columbus for discoveries. The poſseſsion of this faculty encroaches on another of the attributes of *Deity*, *Omnipresence*. It differs with respect to its objects: in Sir Isaac Newton its objects were the *Material World*, Laws of matter, & works of Nature. In Mr Locke, its object was the faculties and operations of the *human mind*. In the immortal Shakespear Men and Manners, all the occupations, paſsions, and busineſs of man, the nature of his heart &c. &c. Immagination is an indispensible ingredient in *genius*, and in the Arts and Sciences of great utility. ——

What is the difference between *fancy* and immagination? According to Dr Stewart the difference is great. Fancy, he says, ennables a *Poet* to render his Images rich and Luxurious: Immagination only supplies him with the Images, Sublime and beautiful They differ further in their objects, those of fancy are phantasms, witches, ghosts, hobgoblins and the like, those of Immagination, tho' equally false, are not

so impossible and unnatural.

Understanding; according to Locke the other faculties are subservient to this; the immagination furnishes us with *ideas*, the understanding connects them. The understanding is the seat of *reason* & *judgment*; it is the *touch stone* of *truth* and *error*. To carry on our comparison of the ship, memory may be compared to the *cargo*, immagination to the *rudder*, and the understanding to the skillful *Pilot*, who conducts them to Port. —

Will. by this faculty we are enabled to choose that which is *good*, and refuse that which is *evil*, — The will is the seat of power, and the basis of human happiness; this determines whether an action be right or wrong: the C say if a man put his neighbours eye out by accident, he commits no crime, but if in a fit of anger, or wantonly, he commits that act, he is criminal; hence the school men tell us, "Voluntas facit peccatum," the doctrine of *freeagency* —

Memory may be compared to a house, Immagination to the magnificient furniture of it, thrown into a yard: The Will to a skillful artist who arranges the furniture, in such a manner as to combine

elegance with convenience; or to continue the comparison of the ship, which is now arrived in port, the will is the *boat* which brings the cargo on shore.

Paſsions are divided into paſsions properly so called, & *Emotions*; the seat of these is the heart; they are to the mind what the senses are to the body. The paſsions are again divided into paſsions and propensities. Paſsions differ from emotions by being accompanied by desire or aversion, which the latter are not; thus Love is accompanied with desire, Fear is not: some of the emotions as anger appear to be accompanied with desire of revenge, but this is unconnected with the emotion of anger— The paſsions are, joy, grief, love, avarice, hatred and the like, emotions are more sudden, as anger, fear, horror &c. &c.

Morral Faculties: these tho' included under one head, are three in number, viz. Morral faculty properly so called, Sense of *Deity*, and *Conscience*. They exist at at birth and are unfolded as they receive impreſsions 1st Morral faculty may be aptly compared to a Legislator, Conscience to a Judge; the first condemns the actions of others, the latter, our own. 2d We have proof of the existence of morral faculty independent of conscience

3d. Morral Faculty may be compared to the *Understanding*, Conscience to the *Will*. Sense of Deity exists in every human mind; Savages possess it. A certain evidence of a first Great Cause, no man ever did dispute or deny; and this is certainly a sense of Deity. In this man differs from all other animals: many animals possess the other faculties of the mind, but *this* belongs to man alone. Morral Faculty even belongs to some *animals* brutes witness the shame which a dog expresses, after having committed a fauth, and his penitent look. But no animal but man has any notion of Deity. Hence the only rational diffinition of man which has ever been given is, "a creature capable of *Religion*". It assists much in rendering man a sociable animal. We could as readily be happy without society, as without this sense of Deity. I said no man ever existed without a sense of Deity. — Captain Cook has made an objection to this; he has seen Savages, he says, who did not possess it: but it is a fact which obtains so generally, that I am disposed to think Capt. Cook was deceived. Whether it be manifested in the worshiping an Image, the Sun, moon or Stars, a Cat or a dog, a bull, a Crockodile, or even an Onion, still I repeat it again, every p. possesses a sense

of Deity, tho' obscured by superstitions. You might with as much propriety object to the universality of vision because a nation of Africans have theirs perverted, as doubt the universality of a Sense of Deity from the perversion of it. —

There are 7 different classes of worship paid to their Deity by the different inhabitants of the Earth. 1st Worship of particular *Winds* and *Clouds*. 2d Worship of a *body*. 3d Worship of a *bad spirit*. 4th A compound of a *good* and *bad spirit*, 5th A *number* of *good* and *evil spirits*. 6th *One good* and *one evil spirit*. 7th *The true God*. Man rises at length to the worship of the propper Deity. — He has no need of the universal homage of mankind, but by a revelation to some has imparted a knowledge of the proper object of worship. From *revelation*, not *tradition* all Worship is derived. Even that of the most barbarous nations originated in revelation much corrupted by tradition. As well could I conceive of hearing without sound, as a sense of Deity from any other source than *revelation*. Conscience is our Regula, Regulata, non Regulans, the only Judge of the propriety or impropriety of our actions. Never was an *absence* of Conscience known from a human being, unless such as St Paul

says have it seared with a hot Iron. Conscience is the high court of Errors and Appeals of the mind; the other faculties are regulated by it. In conscience we poſseſs one of the greatest bleſsings the Supreme being could have bestowed upon us. His care of us is evinced first, in the number of our moral faculties. 2d. In rendering mental ~~of~~ happineſs independent of other mental faculties, so that the wisest men are not the happiest men, as would be the case if Mortal happineſs consisted in the perfection of the other faculties The rational faculties were given us for this world; the moral faculties appear to be designed for that to come. Our ideas of right and wrong are derived from the moral faculties. Conscience acts inſtantaniouſly; the other faculties act slower; in conscience the first decision is always the best; in the rational faculties, second thoughts are most accurate. Conscience like Mentor in the fable of Telemachus, is one guard against a thousand dangers, to which we are exposed.

Life has been compared to a voyage, the moral faculties our compaſs, and the sense of Deity our Pilot who guides us to the destined Port. The sense of Deity is coexistant with our life. As well might we say

the passion of the sexes for each other was founded at puberty because they appear at that age, as suppose the sense of Deity not coexistent with our existance - both of them do exist, and are put in action in more advanced periods of life. Conscience is given us as a witness of the Almighty; "he will not leave man without a witness on earth;" "It is the light which enlighteneth every man that cometh into the world" However unfashionable a doctrine it may be, it is a most true Philosophy; as much so as light is the medium of Vision; for God has made no part of his works in vain, or for waste. Before I dismiss this subject, I will propose the following Queries. - Are there any other faculties than those what we are already acquainted with, which are quiescent in the mind? I answer I believe there are. Do not the alteration which these undergo (with which we are - already acquainted) afford an argument in favour of this opinion? May not our knowledge in a future state be acquired by means of new faculties and senses; and may not these last be the means by which we are to acquire new funds of pleasure and happiness in a future state? All the faculties of

the mind I have thus described, are connected with eachother more or leſs. They may be compared to a well regulated Government, in which memory may be supposed to be the house of representatives, where evidence and facts are collected. The understanding the Senate which has the power of enacting laws. The Moral faculties may be compared to a court of justice where — these laws are enforced; and Will, the Justice, or Supreme Executive, whose deputies are the paſsions. The sense of Deity may be considered the Court of Errors and Appeals.

I have thus Gentlemen, described the mind in health and perfection; folly and madneſs result from imperfection, disease of the *brain* or its seat; of these I shall treat in the *Pathology*; and now paſs to the operation of the faculties. They are

Perception, *Aſsociation*, Judgment, and Reason — You will recollect them and their order by the word *Pair*, which contains their initials.

Perception is the most simple act of the mind. It is the effect of impreſsion thro' the medium of the senses. E. G. If I place my hand by accident on a heated stove, Perception of pain from the heat of the

stove, is the simplest and first operation of my mind. The result of this perception Locke calls Idea. Descarts supposed ideas only images formed of objects, as a house a horse &c. Bishop Berkley supposed the Idea to be a mere deception from our senses, and that there were absolutely no objects in nature. When this hypothesis had made a noise in the world, Buffon broached a theory very different, and agreed that every thing in nature was a subtilized spirit. When human folly had thus got, as every one supposed to its highest pitch, Hume published his essay on the human mind, and called in question the existance of both spirit and matter. Thus, Gentlemen, between these three Philosophers we should be anihilated, the one destroying body, the other soul. Excuse this short account of the Chimeras of madmen, who attempt to reform the world. Every idea in our mind is supposed to be the effect of impressions made thro the medium of the senses and lodged in the brain as in wax, or else made thro' the medium of immagination; this inference, is however, false, from the texture of the brain which is incapable of receiving the impressions of substances as wax; and 2d.

#What is thought? I answer, a motion in the brain. What produces it? Stimulus. How does stimulus produce thought? I answer by producing impreſsion on the nerves, which produces action on these parts of the brain which are the seats of memory, Immagination and Understanding. Ideas are therefore qualities as much as a sound from a bell.

from our being able to form Ideas of things having no figure, as heat cold &c. 3d. Our immaginations is different at different times of the same things or substances. Ideas, therefore, are not substances, but mere qualities; as much so as sound; hence we comprehend the vast extent of memory; in fact it may be infinite, for ideas can nomore produce a plethora, than words can fill a room! —

I divide Human knowledge into two kinds; 1st. Ideas of substances. 2d. A mixture of sensation and Ideas, which is what Mr. Reed calls *Woleons* or *thoughts. Ideas are then produced by some motion in the brain, as well as sensation, a mixture of this motion constitutes *notion* (or *aſsociation*.)

2d. Aſsociation is a combination of memory with a perception. We have a perception of this Stove; to-morrow, upon looking at it, the perception and memory of having before seen it are both excited in the brain at the same time, and Aſsociation is the consequence. Thus also we are able to aſsociate ideas of things we have never seen, heard, tasted smelled or felt; for instance, who can hear of a great hero without aſsociating the name of Buonaparte?

or who can hear of a great and learned Physician without thinking of Cullen Sydenham &c. &c.

Place, influences association. With respect to place, you stood where the first idea was excited; thus by looking steadily at a sign in the dark, you can sometimes recollect the name on it which you were puzzled to see before.

2d of
2. Time; with respect to time, the time of day exerts an influence on association; thus, if an idea struck me yesterday morning when the clock struck 7, it would probably have been repeated this morning if I had been placed in a similar situation as to locality.

3d. The particular position of the body influences association; it would be well if you wish to recall a lost idea, to place yourself into the same position of body, in which you was when the Idea first occured to you. Our time being expired, we will ennumerate the other causes that affect association at our next Lecture.

Lecture 12th

~~Pain~~ Fourthly, Pain has a very remarkable influence on association; hence Women in a dispute with respect to any occurrence, always refer to the time they suffered in Child bed. They have been called living Almanacks: hence boys are also whipped at Landmarks, to make them capable of giving evidence at a future day to the spot ——

5th Letters are a kind of association: I knew a gentleman ~~one~~ a Student of medicine, who could never recollect whether the Umbilical chord contained two arteries or two veins, untill he associated it with Dr Boerhaaves name, which contains two a, a and but one v.

6th By being connected with Pleasure; this you must all know instances of.

7th Certain arbitrary signs are of use in associating Ideas; thus a thread tied round the finger will always recall the Idea you had at the time. —

8th Similar sounds recall Ideas. Thus, the Swiss are melancholy when they hear a certain tune played,

as it recalls the Ideas of past Sorrows: ~~Such~~

9th Words: a remarkable species of association exists between words: if I hear, for instance, the first line of a poem, I am able to repeat all the subsequent part. Some persons from association, are strongly affected at the pronunciation of certain words. I knew a gentleman who had formerly been at the terrible Earthquake at Lisbon, who was seized with great horror at the sound of the word Earthquake. The word blood had a similar influence on an English gentleman at Liverpool, he was seized ~~wh~~ with a fainting whenever it was pronounced; one time in particular, being invited to dine out with a party of gentlemen among whom was a Col. Tarlton, a hero during the revolutionary War; after dinner, in the course of conversation, Col. T. being asked about an engagement in which he was concerned (tho' previously cautioned against mentioning this word) he unfortunately observed there was much blood shed there: The gentleman instantly fell back from his chair and fainted. A boy was affected in like manner at the pronunciation of the word Jesus, as he associated that word with the Idea of a most dreadful Thunder Storm during

which he heard his mother pronounce that awful word at the moment she was struck with Lightning. —

10th. Words which have no immediate concern with the Idea or event, and yet resembles it in some particulars; thus, a person who formerly lived in this City by the name of *Alexander Alexander*, was sought after by a person man who forgot his name; he accosted a man and asked if he knew a person such as he described, but whose name he forgot, it was something like *point no point*; the man instantly recollected Alexander Alexander, who ever after went by the name of point no point. —

11th. Certain degrees of *heat* and *cold*, or temperature, exert an influence on Associations; thus the first warm day in winter gives us an Idea of Spring and all its enjoyments. This is a most pleasing sensation, I have excited it a hundred times. —

12th. Custom has a powerful influence.

13th. Interest. The Miser never forgets the place where he deposits his money.

3d. *Judgment*. This may be defined a continued and combined exercise of Understanding and Memory. Perhaps the word combination would apply

more propperly; it consists in making out one simple pronunciation from two or more Ideas acquired either by aſsociation, or directly from the memory; for example if I am called to see a patient in a *Jail*, or on a *prison Ship*, and if I find him labouring under symtoms which a number more of his companions have in common with him, and if I suppose the disease in all proceed from the same cause; Contagious this I say is an act of judgment: the ideas excited in my mind are such as to make me suppose Contagion to be the cause I exert my judgment in this case. A difference however, between Reason and Judgment may be defined. An instance of the first as I just observed, occurs whenever from two or more Ideas, one proposition is formed.

4th. *Reason*, may be said to consist in deducing *principles* from *Ideas*: for example, I see the application of cold air of service in the Smallpox, and if I suppose (knowing fever to be the same in all cases diseases) that cold air would be of service in the yellow fever, or bilious fever, I exercise my *reasoning power*. — From several propositions, I deduce one ~~proposition~~ *principle*: the 1st. is, that cold

air is of use in the Smallpox. The 2d is, that Small pox and yellow fever are both diseases of an inflammatory kind. 3d. that the operation of cold being sedative, will be useful in all inflammatory diseases; from thence I judge that Cold air will be useful in yellow fever.

The difference in the capacity for exciting the faculties understanding and memory ~~reason~~, forms the difference in the reasoning powers. It exists independently of the other operations + Perception and Association without Judgment. Fools possess them both, and no Judgment. Madmen possess perception, and very remarkable association. A Madman will discover likenesses between persons whom he has known, and those among whom he is which would never have occured to a sensible person: yet this madman does not possess judgment. Again, there may be judgment without reasoning. (you advert to the distinction just made between them).

Besides the above enumerated faculties and ~~of~~ operations, there are a few subordinate ones which I shall proceed to mention. 1st Genius, consists in sudden efforts of the mind, somewhat similar to the last described, excepting that they are much more rapid. Genius flies thro' the air while Reason

and Judgment travel slowly on foot: Genius is more irregular than the latter; they are more slow and sure. Genius is more falacious. Genius opperates with respect to Ideas *not* related; Reason only upon such as are related; the latter rejects such as are false, and such only as are true. Genius is certainly intitled to a place among the faculties of the mind; it might be called *Intuition*. Genius has by some been confounded with *common sense*. Reed has fallen into this *error*. Common sense differs from Genius very widely.

2d. *Taste*. What is taste? I answer, it is a faculty by the operation of which, we are able without the aid of Judgment, to conclude about the propriety or impropriety of any thing: I say *exclusively* of Judgement or reason. Some have supposed Taste to *depend* upon these, but it operates *Instantaneously*. From our account of *Judgement*, it will be seen that *it* requires *time*. Reason is *one* of the *Characteristic* distinctions between *man* and the *brute*. I say *one*, for some animals beside man appear to possess it. The sense of Deity, as I before observed, is the only *infalible* distinction. Taste I would define to be a

distinct faculty of the mind; a sudden perception of propriety and impropriety: it acts independent (as I before observed) of Judgment, but not unconnectedly: hence they have been confounded; but you might with as much propriety confound Moral faculty and Conscience; for they act in as much unison with each-other as Taste and Judgment.

In treating of the faculties and operations of the mind, the influence of the passions should not be overlooked. They are great Stimuli to Genius: they are to the mind what the Senses are to the body.

I shall next proceed to the few remaining operations.

1st. Attention, is the continued application of the mind to one object subject. It is the first operation after perception.

2d. Reflection, is the application of the mind to the particular qualities and properties of one individual object and subject; differs from

3d. Contemplation, in as much as the latter respects a number of objects or subjects. Men of moderate abilities possess the former; but to men of great tallents, the latter exclusively belongs. Bacon,

Newton and Locke were Contemplative Characters.

4th. Wit, is a very quick operation of the mind, accompanied with very quick sudden perception. The Ideas are either similar or else quite the contrary, and please by contrast, and may be defined a rapid aſsemblage of Ideas or images, that excite pleasure either by their remarkable similarity, or total want of similarity.

The strength and perfection, nay the very quantity of the above faculties of the mind, depend very much on Education.

Neither Judgment or Reason, with reverence I speak it, belongs to Deity. It would detract from a knowledge of his Prescience, to suppose he has occasion for either.

5th. Volition, is an operation of the mind. — Does man act neceſsarily, or as a free agent? This is a thorny question, and has been much agitated by Philosophers. I believe Gentlemen, both are true. I believe man to act neceſsarily, or it would destroy the prescience of the Deity; and I do believe him to act as a free agent, or it would destroy all responsibility on his part for his actions, which I do not

not think to be the case. ~

With this Gentlemen, I conclude the Physiology of of the mind; permit me to recommend the study of it to you all. All the works of the Deity are but dust compared with the *human mind*. I might conclude the subject with the words of the *Royal Psalmist*, "All things shall wax old and decay, but thou shalt endure forever." So unchangeable did he suppose the human mind. ~

I proceed next Gentlemen to treat of the pleasures derived from the senses and the mind; let me first, however, premise that *Pain* is the natural state of man. As the absence of stimulus is death, so the absence of sensation is pain. Hence people endeavour continually to experience sensations of some kind. This some excite by that nauseous & loathsome weed called *tobacco*; some by the habitual use of *ardent spirit*; some by strong Coffee, Opium Tea &c. —

However pain is the natural state, it is not necessarily so. Pleasure, in *civilized* life far preponderates over pain, tho' in a *savage* state, I believe pain predominates. The first sensations we receive, I believe to be always painful. The pain which a new born

infant expresses by crying, I suppose to arise from the stimulating effect of the air, which excites inflamation on its skin. Dr. Hartly is of the same opinion: he observes that sounds which are pleasant to us, were originally painful; and urges an instance, the playing a tune to a child 8 or 9 months old which will infalably set it a crying. These painful sensations become pleasant by repetition; of which more hereafter.

I proceed to the proximate cause of the pleasure of the senses. This subject will be interesting, and I trust useful, for Pleasant sensations, certainly form a part of the Materia Medica.

First, of the pleasures of the senses of Touch. The 1st. of these which I shall notice, is a Certain feeling which is perceivable in perfect health; called the pleasure of Self feeling.

The 2d. Pleasure of the sense of touch arises from the contact of the Sexes. This is divided into three species; 1st. the Commerce of the sexes; 2d. the act of Kissing; 3d. from the contact of the skin in any part of the body; this Latter, is very pleasing. Hence the Italian Painter Ariosto, in his beautiful and justly admired painting of Angelica & Medora

points places them in the following manner; Angelica is ~~placed~~ seated on a verdant turf, Medora with one of his hands squeezing gently one of hers, while with the other he points and requests her to look at her name which he has carved in the Bark of ~~the~~ a tree: his knees are placed in contact with hers. Sir Joshua Reynolds upon seeing the picture, was so struck with the justneſs of the Idea, that he declared he would have given a thousand guineas to have been the author of the thought.

3d A certain temperature of the air, which perhaps varies at different periods of life. This State of the atmosphere does not very frequently occur. In Italy it is perhaps the most ~~f~~ common of any place in the world; hence travellers paſsing thro' Italy describe the raptures they feel from the climate of that country. In England it sometimes occurs during the Spring months. I think I have experienced it in this City in the month of June. Pleasure too is experienced from a higher degree of heat, such as is felt in standing before a fire. Another mode in which air may act perhaps, is by the pure air it affords to the Lungs; this is accompanied with

# This is Dr. Rush's term for pure air

an agreeable warmth, as those who breath ***dephlogisticated* air inform us. Dr Beddoes has proven that this sensation may be heightened to rapture by respiring *dephlogisticated nitrous air*.

4th. The sensation produced by the *warm bath*. This was well known to the inhabitants of antient Rome; To increase the pleasure of it they sometimes bathed in warm *oil*. The estimation in which this was held ~~will~~ may be estimated from the costliness of the baths made use of; some of which were silver and ornamented very highly. The late Dr. Franklin eased his passage out of life by means of ~~the~~ warm bathing; he spent whole hours in the letter part of his life in his bath; it composed him to sleep in many instances.

5th. Certain motions of the body: The pleasures resulting from certain motions of the body, are to be attributed to the sense of Touch: Among these are dancing, riding, swinging, walking after a long rest &c. I might here mention the *Chase*; Some men experience more pleasure by the chase, than any other way: Whence they derive their pleasure, I confess I cannot say. Can it be from the cold air bracing them up as it were? Hunting is usually in cold weather, and in the coldest part

of the day viz in the morning. Can it be from the sound of the horn, or the Cry of the Hounds? This may have some effect in exhilerating their spirits. Or is it not rather from a knowledge they have of the frequent escapes they have from accident and Death? This is most probable; it is what the Indians call the *joy of fear*: after a battle in which they found great danger they experience this joy and give it this name.– It cant be possible that men can join in the pleasure which their hounds have over so contemptible and harmless an animal as they pursue.

Under this head too I may mention the pleasure of *sailing* both on *water*, and in the *air*. *Balloons* I hope will one day become the common mode of conveyance. The famous Mr Blanchard informed me the pleasure is indescribable. They may become, Gentlemen, an article in the our Materia Medica, in diseases of moderate action. They will not be liable to the inconvenience of sailing on water.——

6th The sixth source of the pleasure to the sense of touch, is certain medicines taken into the stomach, as 1st after a dose of *Opium*; this persons describe as a pleasing sensation. 2d *Stramonium*; this is the common

Jamestown weed; it is used in the East Indies as coffee 3d. *Tea*. 4th *West India coffee*. 5th *Tobacco*. 6th *Ardent spirits* and *Wine*. 7th A *sudden* relief from *pain*, is a source of great pleasure. Hence women who have been in child-bed speak in raptures of the pleasure they enjoy after delivery; they say "they are in *heaven*."

8th Certain soft substances applied to the skin gives a pleasing *sensation*, as *down*, *fur*, *silk* and the like. Also a certain titilation on the skin, is a source of pleasure to many; such, for instance as the gentle friction of a soft hand on the leg; this is a most pleasing sensation to a sick person, as also the looking the head for *lice* as it is usually termed. —

9th Peculiar *Idiosyncraſies* of different people, by which they are ennabled to derive pleasure. I knew a gentleman who experienced a great degree of pleasure when his arm was tied up previously to bloodletting. Similar cases of pleasure from trifling sources of this kind now and then occur.

Before I dismiſs this subject I have to observe a kind of *Hermaphrodite* pleasure, that of *Slaying*; the cold air which always is present when the snow is on the ground, is an antagonist to the pleasure

to the pleasure of the company, and the exercise of the Sleigh. Also the obstruction of all stimuli from every sense, produces in some cases great pleasure; Darkness silence, want of odour &c. — This pleasure is to be attributed to the sense of feeling; how far the mind is concerned with it I will not say.

I will here make an addition to the number of the pleasures of the sense of feeling, in which I am sure you will none of you anticipate me; I mean the pleasure of *Dying*! Strange as you may think it, that to die is *pleasant*, it is no less a fact in many cases. The agonies of Death, is a very common expression, but it is not always a just one. Pain does not alway accompany the *extinction* of life. *Adison* long ago spoke of

"The *pain* the *bliss* of Dying."

The late Dr. Wm. Hunter in his last moments addressed the following words to a friend at his bed side, "I wish I had a pen and ink, and was able to write, that I might describe my feelings, and record how pleasant I think it is to *die*". General Butler who fell on the 4 of November 1791, at St. Clairs defeat, expressed the pleasure by saying "he did not expect it was so pleasant and easy a thing to die!!

"I feel as if I were sinking into a pleasant and easy sleep!!" The placid countenances which are observable on some persons who have died, which form a striking contrast to the frown and agony which appear on some others, denote ~~th~~ sufficiently the pleasure they feel, perhaps in the prospect of a better world.

The late Judge Hopkinson once told me of an idea he formed of making a Scale, similar to a musical one, in which the degrees of pleasure arising from the application of certain substances to the skin should be marked. The Idea was certainly an ingenious one, & might possibly be carried into effect.

The sixth subject for our consideration, is the pleasures to be derived from the sense of Taste.

Had our lives depended on reason for support, we should die from negligence; but Nature has providentially warned us of our danger by giving us the sense of hunger, when we neglect to provide food. The pleasures of this sense (taste) acquire addition by hunger; hence we are able, when urged by hunger, to make a hearty meal on food, which at other times would be very unpleasant. Habit makes many things agreeable to the taste which were originally

unpleasant; thus *tobacco*, that most loathsome weed becomes pleasant by habitually chewing it: hence also we explain the fact that onions, garlic &c. become pleasant. Hence the *Olla Potreda* of the Spaniards is palitable to the inhabitants of that Country. Hence the inhabitants of the Highlands of Scotland find a relish for their *onions*: hence too, the French season Beefsteaks with *asa foetida*. ——

To relate the simple objects of taste would require a volume, not to mention their infinite varieties when compounded. The combination of acid substances, as *vinegar*, pepper, and other condiments, become necessary to stimulate the appetite when it begins to flag; and also to increase the pleasure of taste by heightening the sensibility of the tongue (its papillae). The *Rhinoceros* it is said accomplishes this purpose by licking *thorn bushes* before he attempts to eat —

I shall add, to prove the pleasure of this sense, the estimation in which the luxuries pleasures of the table have always been held. Fortunes have been expended in the single article of *good living*. The pleasure of eating is increased by a concentration of

sensation in the tongue, which abstracts it from other senses.—

Dr. Blackmore relates a case of a patient of his who had an inflammation of his eyes, which if not brot. on by good living, was at least protracted perpetuated by it, and prevented from being cured. The Dr. at last told him of the danger he incurred of loosing his eyes, unless he abstained somewhat from his intemperance in eating; he replied "I have seen enough Doctor, but I have not eaten enough, therefore I will eat on at the expense of my eye sight. A person in London who had once seen better days, was beggared; he asked alms of a former friend, who gave him a guinea: he was hungry went off to a cookshop & expended the whole of his guinea but half a crown for a Cucumber; with this half crown he purchased a beef steak, & made one hearty sumptuous meal.

Heat is necessary for the pleasures of this sense: Cold substances loose much of their sapidity. ~~I~~

I will dismiss this subject by observing that had the French, instead of desoleting all Europe with their wars, been employed in their kitchens, perhaps fresh articles of delicacy for our dishes would have been discovered, and thus they would have rendered

a much more eſsential service to mankind; for I am persuaded many delicacies of this kind remain to be discovered.

Lecture 13th

I Shall next notice the pleasures to be derived from the Sense of Smelling.

Every hill, every vale, every rivulet's shore afford pleasure thro' the medium of this sense. –

There is something like Baſs in the smell of the Magnolia, and Tennor in that of the Rose and the Pink: After these rank the Jeſsamine, the Jonquil, the sweet scented shrub ~~which partakes~~ of Carolina, which partake of the smell of the Pine apple and the Strawberry. — Odours please by con~~trast~~ mixture: Contrast contributes in an amazing degree to their pleasureable effects; thus after smelling Asafoetida and the like odours, the scent of the rose is infinitely more delightful. – Moisture contributes to render odors agreeable; hence in the

morning and evening, when the dews are on the ground flowers smell much sweeter than in the middle of the day. It would seem as if Nature intend that even the gratification of this sense was to be purchased by the labour of man. Flowers always derive fresh fragrance from *transplantation*; the effects of of cultivation on them is truly surprising ~

This sense, like the others, is liable to become perverted; hence some people delight in the smell of Tobacco, Asafoetida, musk, Civet &c. &c.

The nose may be made the medium for the exhibition of medicine. I have attributed the *medical virtues* of the Country air (in many forms of disease) to the fragrance of the flowers. ~

We come next to consider the pleasures derived from *Vision*. ~

Where shall I begin the pleasures we enjoy derive from this sense? Or where shall I find Language adequate to describe them? Scarce an object exists in nature, but may be capable of pleasing our Eye. ~ Light, Colour, figure, magnitude, Height, and Motion, all contribute to afford pleasure to this sense. 1st. Light itself is a most pleasing sensation. *Milton* describes

the pleasures derived from the beauties beams of the Moon broken into small shadows. 2d. Colour; many and various are the pleasures we derive from this source; the azure blue of the Sky, the green of the Earth are peculiarly agreeable; the red, Orange, Violet, and white, afford much pleasure; like sounds, they are related to eachother In different Substances different Colours please best: White and red in the human face; in mettal, a yellow color pleases most; this has been explained upon the supposition of the value of Gold with the Idea of colour; but this I deny: Give an Indian who has never seen a piece of money in his life, a piece of Silver and a piece of gold, he will take the gold in prefference. White next in order among the Mettals, he will prefer Silver to Copper. Variety in colour is agreeable; hence the various hues of the rainbow are so much admired. Colours, I said are related: They have a greater or less affinity with each other; hence the pleasure. "Such an one dresses with art," is a common saying; it only means that some Lady or Gentleman wears clothes that suit their complexions; it has very little dependence on the fashions of the cloths. 3d. We derive much pleasure from Figure.

According to Hogarth, figure pleases in proportion as ~~to~~ (what he denominates) the Line of Beauty occurs in it more or less frequently: It is a particular curved line, that occurs most frequently in the human figure; hence man is the handsomest animal in Creation; next the horse. hence too, we feel more pleasure in viewing a Cupola, or Steeple, than a Manor house; the line of beauty occuring much more frequently in the former than in the latter. A room is always handsomer for this circumstance. The famous Statue of Venus de Medicis, owes its fame to the frequent occurence of the line of beauty. 4th Gentle Motion. "The noding forest, the waving Cornfield, the gentle purling stream," all afford a most pleasing sensation. Motion to please, must be slow; Milton well knew this fact, hence he describes the Angel in Eden, as "slow moveing without step!" Hence the pleasure we feel in viewing a Country Dance; this has two reasons for pleasing, 1st the slow motion, and 2d the motion is in a line of beauty. 5th Height, Distance and magnitude, so frequently united, strike us with pleasure.

Extravagant pleasure, like Grief strikes us dumb. A Lady, who with great perseverence had gained the top

of Mount Blank in Swisserland, from whence she had a prospect of sixty miles in extent beneath her eye, villages, Castles, Towers, and mountains rising over mountains toped with forests, was so struck with awe at the prospect, that she fainted away. Mr Bridance describes the awful pleasureable sensations, excited in his mind by the eruption of Mount Etna, which casts a light for 100 miles. – Mr Bruce describes too the awe with which he viewed the immense Cataract of the Nile. He forgot for a while all the dangers and difficulties he had encountered, and felt fixed and motionless on the ground where he stood. He almost forgot the promise of the Almighty, and thought the destruction of the world was again begun by water. The Spirit of the Queen of Sheba died within her when she beheld the magnificence of the temple of King Solomon. Height unconnected with magnitude excites pleasure, hence the pleasure we derive from looking at the moon and heavenly bodies, tho habit has detracted much from this pleasure. Hence also the eagerness with which people look at the ascension of a Balloon into the higher regions of the atmosphere. Combination of colour and motion, add much to

the pleasure we enjoy on looking at ~~the~~ distant objects which possess both these properties, as a *flag* on a mast head. What can be more sublime than a Sea agitated by tempest viewed from the shore? — 6th Contrast adds much to the pleasures of seeing; hence Lord Kaims observes, "that a Garden in a forest, should be *perfectly regular*, but in a City, wild as possible." — Mr. Niensiwiche Aid de Camp to Gen. Kosciusko, informed me when in this City, that the sight of a green leaf gave him the greatest pleasure he had experienced from looking at any object immediately after being set at liberty from a confinement of two years in a jail at Petersburg, where he beheld nothing but the black walls of his prison, for that space of time. —

I shall conclude this subject with a few lines from — Mr. Grey.

Pleasures of *Hearing*. From our entrance into the world we are besieged with pleasures from this sense. Perhaps no sound can possibly be more pleasing than the *human voice*; tho' habit has rendered us almost insensible to its charmes. Our mothers voice is the first sound we hear; and nothing pleases us more —

Public Speakers, I am persuaded, charm as much by the melody of their voices, as by their Eloquence -

Such are the powers of music, both vocal and Instrumental, that the Heathen Poets tell us Hell has been made to open its Gates and render up its prisoners by the powers of Music. And we are tought by Revelation that the gratification of this sense will form a part of the happineſs of a future State. Were I in want of arguments to prove the charms of music, I might mention the enormous sums lavished to gratify the Ear. Count Osinske a Polish Nobleman, spends annually £25,000 in musical Instruments.

Innumerable are the sounds which salute our ears; the winds, the feathered tribe, the lowing of cattle, the bleating of Sheep, the hum of bees, the purling of streams over pebbles, all afford pleaſure to this sense. A fresh proof Gentlemen, that Deity never intended pain to predominate over pleasure, or evil over good. I cannot prove this better than by authority from Dr Price. "If evil were intended to predominate over good, every animal in Creation would annoy without aſsisting us: The light of day would have dazled without comforting us.

The Earth would produce nothing Spontaneously: Every vegetable would be poison: The fire would scorch without warming us: The sound of musical instruments would torture instead of pleasing us: In a word every taste would have been a bitter, every sound a Scream.—

Much, Gentlemen, has been said about the equal rights of man. How far nature intended men to be on an equal~~footing~~ity in other respects, I will not undertake to say; but in the distribution of the Senses he was certainly no respecter of persons. The hungry Beggar that lives at the gate of a rich mans kitchen feels as much pleasure with the offalls of his table, as the King who dines at the most sumptuous table. The African perceives as much pleasure from the course sounds of the Banjo, as a Nobleman at the most expensive Concerts. We do injustice however, to suppose that our evils proceed from the fountains of Good: They are derived *not* from *God*, but from the *folly* and *wickedness* of *man*!

When I treated of sensation, I observed that some are increased, others diminished by repetition. This I now repeat. Another fact I then mentioned

is, "that no two sensations of equal force can be coexistant. An ignorance of this law of sensation, has led the votaries of sensual grattification, to enjoy several of the sensations at once, as music and Eating &c. They are either enjoyed in succession, or else from their combination a new sensation results; in the same way that green results from a blue and a yellow colour.—

With this Gentlemen, we conclude the account of the pleasures of the senses. Their final cause and use must be sily evident. They are a great source of our happiness; but they have their alloys. As 1st What are all the delicacies on Earth to a man labouring under a fit of the Gout? Good health is absolutely necessary to the enjoyment of the pleasures of the senses. What again, are all the variety of Colour, height, distance, magnitude, figure & motion, to a man afflicted with Melancholia, or Hypochondriasis? 2d The pleasures of sensation too are of a limited nature. Too much of it fatigues the mind as Solomon long since truly observed. 3d They are connected with Pain. Pain and fatigue follow the too great enjoyment of ~~th~~ sensual gratifications.—

No fatigue is so great as that from inordinate pleasure. And Lastly all sensual pleasures are of short duration. Allowing them to be enjoyed in the begining of life, oldage comes on and impairs their relish for them; and the grave is finaly the utter extinction of them; this too is a wise precaution of the Creator, and shews his goodness. By it men are directed to seek the more substantial pleasures of the *mind*; of which I shall next proceed to treat.

I shell first treat of the *pleasures* to be *derived* from the *faculties* of the *mind*. 2d Of their *final Cause*. And 3d Of the *proximate cause* of pleasure as derived from the *senses and faculties* of the mind, observing the same order as I have done when treating of the pleasures of the Senses.

First, of the pleasure to be derived from

Memory. In the exercise of this faculty we *live* as it were our *lives over again*, and enjoy in old age the pleasures of our youth; nor is this all, by the possession of this faculty, to converse with our absent friends, to view all the wonderful works of nature & art in the most remote parts of the Globe. We view by our fire side the battles that were faught 1,000

years ago, by the heroes of Antiquity, as well as those of the present day.~

Immagination. Mr. Akenside, as well as Mr. Addison, has observed of this faculty that it endows us with a creative power. At one time it exalts us to the highest pitch of Millitary or Literary fame: next it raises us to the Pulpit, where, with all the graces of Oratory, we excite by our Eloquence the wonder and astonishment of thousands. We listen with rapture to the accents of our voice; at one time it wafts us across the Ocean & ennables us to view the Countries of all Europe; at another time it situates us in our own Country, making discoveries of the highest importance to ourselves and an *admiring world*. In a word, by the Immagination we are ennobled to rise in Balloons, and build Castles in the *Air*!

Understanding. The pleasures of Understanding are of a most sublime nature, and of the most delicate kind. To this faculty we are indebted for the pleasures *of taste*. Archimades when he had solved a difficult problem, could not help exclaiming in the midst of a large company, Urcha, Urcha! Dr. Rittenhouse fainted away on observing the *transit* of *venus* over

the Sun, which occurred in the year 1769. Lord Mansfield, when he was engaged on the busineſs of the Bench, declared that he never felt either hunger or thirst; so entirely was his understanding engaged. The pleasures of Taste are said to be attributed to this source; as that of the disposition of Colours in Painting: the three unities in Dramatic pieces, order and arrangement of figures in composition; in short every subject in which taste is concerned, operates on the understanding. So exquisite are the sensations induced in this faculty, as to cause fainting, as was the case of Mr. Rittenhouse. Octavia, we are told, fainted on hearing the lines in Virgils 6th Eneid, which predicted the future glory of her sons

Heu miserabile Puer tu Marcelus eris &c

Will. The pleasures of Liberty, that Bleſsing for which Oceans of Blood have been spilt, are to be attributed to this faculty. So great is the pleasure induced by unexpected Liberty, that an instance occurred in which fainting was induced by it, in a Negro, sold in the Delaware, whose master as soon as he purchased him gave him his liberty; the man fainted, and was with difficulty recovered.

Paſsion. It would require a volume to describe the pleasures we enjoy by our paſsions; even the most blamable of them as avarice Reveng and the like, have their pleasures. but those of the noble paſsions are *inexpreſsible*. Hope, — friendship and the like are exquisitely pleasureable; while Love creates a little Heaven on Earth! —

Moral Faculties. It would require a pen made of a quill plucked from an Angels wing, to describe the pleasures resulting from this faculty. Their nature is the most sublime, the best, the highest we are capable of enjoying. When we spoke of the senses, we took notice of them as being liable to perversion, and urged as a proof of our aſsertion, that Asafoetida and other unpleasant odours, became, by the perversion of the sense of smelling Pleasant. This is also the case with the Moral faculty; in proof of it I urge the desire of revenge which many *poſseſs*; also the pleasure which many people take in the Pain and torture of animals, and even of their fellow *Creatures*. Thus I heard of a person who resided at Paris during the commencement of the French revolution; who declared the most delightful music he ever heard was the sound of the *Guilotine*, when employed in cutting off the heads of 20 or 30 of his —

fellow Creatures in a day. I heard of a member of the British Parliament, who used to go in disguise to every Execution in and about London, for the purpose of getting as near as possible to the Gallows! It is probable that in Agriculture the Moral Faculties are most perfectly enjoyed A taste for this employment seems to have been born with us. The War worn Soldier, the Sea beaten Mariner, the Wealthy Cityzen, alike please themselves with a hope of ending the~~ir~~ troubles of this life by cultivating a small spot of Earth. No enjoyment is more congenial to the taste of Man. I might under this head, take notice also of amusements as they are called, such as - cards, dice and the like; some of which are capable of affording the highest degree of Pleasure. Perhaps they are compounded ~~from~~ of pleasure from the sense and the mind - Love is increased by dancing; Friendship is enjoyed over the Bottle &c.

Lecture 14th

Having concluded our account of a few of the most common pleasures of the senses and of the mind, I next proceed to treat of the Proximate Cause of each — And first of the proximate cause of the pleasures of the senses.

I will here deliver a Proposition, That Motion is neceſsary for the sensations of Touch, Taste, Smelling, Sight and Hearing — My next Proposition is, That pleasure consists in a limited, regular and orderly degree of the *same impreſsions*; which if greater in degree, irregular or disorderly, ~~excite~~ excite *pain*. Take notice of this proposition Gentlemen, for it forms a very material part of the subject under consideration. I say too, that those stimuli, which in exceſs excite *pain*, do in a limited degree excite *pleasure*. These are 1st Distention, 2d Morbid action in a part. 3d Chemical and mechanical stimuli applied to the part. The Antients were well acquainted with the *relationship* which exists between *pleasure* and *pain*: in the fable of Socrates they are said to be

two sisters, the one admired and courted wherever she went, the other hated and avoided by all mankind. Jupiter, to put them both on a footing, so ordered, that whoever embraced the one, could not avoid partaking also of the other. The words of a well known song give testimony of their affinity.

"Those dear Eyes, so soft they languish,
"Feel my heart with raptures beat,
"Pleasure turns almost to anguish,
"When the transport is too sweet"!—

Pleasure then consists in certain vibrations of the *Nerves*, which are harmonious and regular in a definite degree: Pain consists in a greater or leſs degree of those vibrations, or in an inharmonious order of them— Distention, I said produces pleasure; in a more immoderat degree pain is the result. Opium produces a degree of distention in the veſsels; and opium induces a pleasing exhiliration of the *Spirits*. Also the warm bath; this if of a moderate temperature, is highly pleasing; increase the temperature and pain is the consequence. The warm bath acts by distention, also wine brandy &c.

2d Do certain motions of the body when exceſsive

induce pain? in moderate degree they are pleasing. What more pleasing than moderate exercise. Does *debility* when excessive give us painful or unpleasant sensations? In a more moderate degree it is pleasing. Rest after labour is very agreeable. Also the sensations after Childbirth, as we had occasion to observe before, are highly pleasing. Ease from the Colic, and innumerable other instances might be adduced. Some sensations are pleasing to certain people, which to others from peculiar Idiosyncrasy, are painful. Thus I knew a Gentleman in Edinburgh, who had the sensation in his fingers so bear, if I may be allowed the expression, that the contact of a soft substance which would please any body else, was to him the most exquisite *Torture*, as bad as if laid on a bear nerve. I knew a young man formerly in this City who shrunk with horror at the touch of a treacle.

3d. Do the application of rough substances, when applied to the surface of the body, produce pain? The application of smooth surfaces is pleasant, by exciting an *harmonious vibration* of the *nerves*, which the rough ones were not capable of doing. Is it not true that certain sensations are of a mixed nature, partaking both of pleasure and pain? Of this kind are tickling on the soles

of the feet; certain stages of the Hysteria &c. This depends in Hysteria on the predominance of the pleasing and unpleasant over eachother, which is alternate. First the patient expresses uneasiness, then the most extravagant pleasure. The pleasures of each of the senses will require a specific explanation. Mr Reid supposes the variety of tastes of sapid bodies depends on their mixture with the Saliva, and the production of a *tertium quid*. May not the variety in the other sensations be produced in the same way by certain mixtures of harmonious and unharmonious vibrations of the *nerves* of the part? Since we have seen that mixture of blue colours, and yellow produce green, and that there are sensations of the skin that are both pleasant and painful. How does the human face impart pleasure to our eyes, but by the reflection of certain rays of light, exciting harmonious vibrations in the nerves of the *Retina*? And how does deformity pain us but by reflecting rays of in unharmonious order to our *Eyes*? —

Thus I have compared the operations of all the Senses to those of the Ears. The analogy I think holds good in all the other senses. Haller supposed there was an influx of *blood* to the part during the action of the organs of the ~~part~~

senses: This obtains in the act of generation, and perhaps in one or two others, but it certainly does not in all the Actions of sensation. In all the pleasures we mentioned to depend on relaxation, there is less blood than at other times: In a word then, all pleasure depends on moderate, definite and orderly *impressions*; pain on the disorderly immoderate, irregular *impressions*: both are qualities. But we have here one difficulty to encounter, and that is, that some sensations become stronger by repetition, while others loose their force: Of the first we mentioned an instance in the dropping of water on the head; of the second Tobacco, Opium, Ardent Spirits, afford us familiar examples: Besides all pleasurable sensations loose their relish by repetition. These facts can only be explained by saying that the *Will* of the *Creator* is, that the *fact* should be *such*, to make us seek the enjoyments which are to be derive from the *mind*, which are more durable. From all that has been said we learn that pleasure is a mere *quality*, or effect, depending on the peculiar organization of animal matter, which enables it to receive certain impressions from *Stimuli*. When we were treating on the senses, we observed that certain sensations originally painful, became pleasing by

from habit. The cause of this I next proceed to explain— I have said that pain depends on the excessive action of pleasing stimuli; and that pleasure depends on impressions moderate, and in a certain order. I have also said that strong impressions by habit become weak, and vice versa. Now, on this conversion of strong to weak sensations, depends the pleasure derived from impressions which at first were painful, as tobacco, opium, garlic, olives &c.— These in 99 cases of 100 are all unpleasant when first used but by repetition they act less powerfully, and consequently induce pleasure. — — From this view of the subject it appears to me truly Philosophical to believe in the pleasures which people formerly took in ~~t~~ viewing the fights of the Gladiators; and in the delight which Tyrants feel in shedding the blood of their fellow men. The impressions which these sights first had, no doubt were painful, but by repetition are reduced down to the pleasureable point.

2d. Pain from duration wears itself out. From this we see the reason why women bear pain better than Men; ~~Have reason sooner~~ because the stimulus of pain sooner wears itself out as it were, in women than in Men. Their nerves sooner take on a kind of Paralasis

3d. Pleasures from duration, become less pleasing.— The pleasures of seeing, hearing, tasting, smelling and feeling, become less pleasing to us in old age. The feebleness of impressions is the cause of it. Solomon was well acquainted with this fact.

4th. But one sensation can exist at the same time. Hence we explain the fact why Martyrs feel no pain amidst the flames which destroy them; the more powerful sensations are those of their minds; and the Corporeal pain is not perceived in the prospect of their joys of a future State. Hence too, has been relieved by the pressure of a friend, pain from a fit of the *toothach*, and other slight indispositions; so that this is as useful a truth to the cause of *Christianity*, as to the *Animal Economy*.

The final cause of the pleasures of sensation are obvious; they prompt us to *eat*, *drink*, and *propagate* our *Species*. They invite us to view the works of our Creator, of course to admire them. And they ought to lead us to *Eternal happiness*, since they shew us the folly of all *human* enjoyments. —

Let us next enquire into the proximate cause of the pleasures of the *Mind*. The Stimulant effect

of the operations of the mind, I took notice of in our Lectures on Animal Life. Perfect life we said consists of mutual action of body on mind, and mind on the body. 1st The fatigue of the memory and imagination, proves the action of the mind on the Brain. 2d It proves that the mind acts on the body, by the quick pulse, hemorrhagies from the lungs and nose, in affections of the minds, and the facts related in Mesmers Animal magnetism. 3d Dejection of the spirits, fainting and hysteria prove that the mind acts on the nerves. The discharge of Urine from persons under the influence of fear, and Bile from those under that of anger, prove the effects of the mind on the alimentary canal and on the stomach, as vomiting and diarrhoea often accompany the increased secretion of Bile, but particularly on the Glandular system, the liver and Kidneys secreting a greater quantity than usual. But to our immediate subject; the proximate cause of the pleasures of the mind, like those of the Senses, dependson stimulus.

The pleasures of the mind depend on an harmonious vibration excited in the brain, as those of the senses on the nerves. Distention and relaxation influence these vibrations of the brain in the same manner as of the nerves.

Joy, love, and other passions are evidently accompanied with distention; while probably ~~the~~ in Hypochondriasis and some other diseases of the mind, the Brain is in a State of relaxation. The final Cause of the pleasures of the mind is, to increase the activity of its faculties, and lead them to search for real happiness and true good. It is a folly for men to argue that the pleasures of the senses ought not to be enjoyed: it is an eternal and unchangeable Law of Nature that they should be. The Monk, therefore, who shut up his window which commanded a beautiful Landscape, committed a Sin against the Author of Nature.

Repetition blunts the excessive action of the operations of the Mind, in the same manner as of the Senses. A fond mother, who has lost a darling child, will not dare to see its grave for a twelve months; but after a time will visit it, not only without pain, but with highly pleasing tho' Melancholy sensations.

Thus Gentlemen, I have finished my account of the pleasures ~~of the mind~~ derived from the Senses and the mind. I must observe here that repetition diminishes those of the mind in the same manner as those of the Senses. Of the Senses, I mentioned instances of Tobacco, Rum,—

garlic &c. becoming agreeable by repetition. Instances of similar effects on the mind I shall now relate. —

An ugly Woman has more charms to her Lover than a handsome one; at least the impressions made on a man by an ugly woman are much more durable lasting, than by a handsome one. The observation was first made by Labruyere, and I believe in it firmly. The first question they that ~~I~~ would ask them, if consulted on a Love case, would be, is she handsome or ugly? If ugly, little hopes! — Dr Horn relates a case of a man to whom the Ideas of *death* and Judgment, were a source of so much *horror*, that he could not think of them without the most terrible Emotions. This man overcame it by retiring every evening, and devoting a portion of the evening to a consideration of this subject. The impression by repetition became less forcible, and in the course of time by persevering, he was able not only to think on it without pain, but it was one of the greatest pleasures of his life, the contemplation of this subject. —

Is not this a strong argument in favour of our opinion that pain was never intended by the Supreme Being to predominate over pleasure, or evil over good? And is not the reason for our not enjoying perfect happiness here

*Quere. Is not this a mistake? Would it not be proper to reverse the order? C.L. C.S.

that we may be directed to the true source of happiness?

I proceed next Gentlemen, to consider the state of *Sleep*. Life, we defined to consist of *motion*, *sensation*, and *thought*. These three States obtain in the waking state of the perfect Animal: but in Sleep there is an absence of sensation and thought. Sleep is then to Sensation what rest is to motion & darkness to light. Sleep has in one respect a tendency to Death, as it is attended with an absence of sensation and motion. It has, tho' a tendency to life, as excitability is increased by it, and excitement Equalized. Sleep occurs naturally when the sistem is debilitated or reduced, to what Dr. Brown very happily called the sleeping point. Cullen supposes this to consist in the collapse of the *brain* — During Sleep, as I said before, there is an equilibrium of excitement and excitability takes place. And Sleep never occurs when the system is depressed below the sleeping point, or when raised above it; this depends on the greater or less stimuli ~~wh~~ we have been exposed to thro' the day. If we have been exposed to much fatigue, we raise the *excitement* at the expense of *excitability* *. And Sleep is necessary for the equilibrium. If the system is below the sleeping point, stimuli are necessary

to raise it to that point, as Opium, Strong tea &c. If it be raised beyond the Sleeping point, it must be reduced to it by evacuations &c. The way in which sleeping is induced in crowded assemblies, depends I think on the debility induced by respiring *Mephitic air*

The *remote causes* of Sleep.

These are divided into such as *raise* the system to the Sleeping point, and such as *reduce* it to the Sleeping point. The former act *directly*, the latter, *indirectly*; these last are as follows, 1st Labour; this induces Sleep as you must all have experienced. 2d. Certain Stimuli, of aliment, drinks; as wine, ardent spirits, opium, tea, coffee and other narcotics; they raise the system to that grade of debility in which is the Sleeping point. Phlogisticated air probably acts in the same way in crowded assemblies. 3d. Certain noises or sounds such as exist in all Cities. 4th Heat after exposure to cold. 5th A long and painful exercise of the understanding on any interesting subject. These and many other causes which will occur to you, may be called the remote causes of sleep, which induce indirect debility.

Next such as produce it by *reducing* the *system* to the Sleeping point. They are 1st the abstraction of certain

stimuli, as Sound, Light, Sensation, and Muscular motion in the body. 2d. Certain evacuations, as bleeding purging, vomiting and the like. 3d. Certain substances applied to the body, as oil, also cold ~~water~~ air. I might also reckon under this head the gratification of the venereal appetite. 4th. Abstraction of pain, hence persons sleep sound after being relieved of a fit of the Cholic, as also after Childbirth. 5th. Sedative Passions, also constant thinking on any particular subject, hence according to the report of Mr. Ackerman, Keeper of Newgate, the Convicts always sleep well the night before Execution ~~the nights before they~~ when they are sentenced to Death. Mr. Custin who was beheaded in France, wrote a letter to his wife a few hours before his death, informing her of his having slept the whole of the preceding night; here despair, and constantly thinking on one subject has a sedative effect.

Those are the means of subducting stimuli when we are excited above the sleeping point. Those which act by raising the system from a state of direct debility to the sleeping point, are, 1st. Gentle exercise as walking, riding, rocking in a cradle and the like. 2d. The moderate use of aliment and drinks, also

opium, tea, coffee, and the like. These must be regulated as to quantity, for too much will raise the system above the sleeping point. 3d Certain sounds to which we have been used. I knew a watchmaker in this city who was unable to sleep without 20 or 30 watches ticking at his head. The hum of a bee has been known to induce sleep; ~~also~~ 4th moderate warmth, Pediluvium &c. Sleep is prevented by ~~thinking~~ ~~on~~ certain acts of the mind, as thinking on an interesting subject; this may be remedied 5th by counting a hundred backwards. 6th Light; this stimulus frequently causes sleep in such as have been accustomed to its presence in their chamber; such people frequently fall asleep at break of day, and probably from this source; I have at least known many instances of it.

Let us next attend to the Phenomena which occur during Sleep. These shall form the subject of our next lecture.

Lecture 15th

Having at our last lecture explained the causes which induce Sleep, and the three different modes of their action, Viz. 1st in the case of indirect debility, 2d. by the subduction of Stimuli. 3d. by raising the system to the Sleeping point, I proceed next to deliver a few observations on the Phenomena ~~that~~ attendant on Sleep. 1st. It comes on by a pricking pain in the Eye lids, and sense of weighth, so that we can with difficulty keep them open: Pain in the limbs, is the next perceived Symptom this in young Children is so acute as to make them cry out; it is caused by debility of the indirect kind which invites morbid action to the muscles. Sleep is caused by fatigue of thinking, as well as bodily fatigue and the intellects are first affected; the head totters first, then the whole body takes the horizontal, position, which is best adapted for sleep. In some cases we start in our Sleep; this is owing to the two suden abstraction of Sensation and motion. 2d. In Sleep there is a diminution of Sensibility, hence in cases of Stone in the bladder, there is very little sensation

of pains during Sleep. The relaxation of the muscles is owing to this cause — in Sleep the natural actions are slower, hence the pulse is slower; the process of respiration is slower. Animal heat is a degree less in the sleeping than the waking State. This probably arrives from the obstruction of the Stimulus of Musculor motion, And the heat of the bed clothes may contribute to their relaxation. — Sometimes the are not performed as quickly, in the sleeping, as the waking state, hence we seldom desire to make water during the night, hence diarheas less violent in sleep; — hence persons under Tialism from mercury discharge less saliva during the night, hence too people who sleep much become fat.

5th.- More heat is requisite for the animal when sleeping than when awake — 12° Fahrenheit will be sufficiently cold to distroy life in the sleeping state. But according to Mr. John Hunter, Animals can resist a much greater degree of cold when awake. The system is weaker when asleep, and more excitable. Hence we find the gout, Epilipsy, and

others diſeases, make their first attacks in the night. Children sleep more than adults, and abortive Children more than those who had gone their full time in Utero. — Old men sleep leſs than middle aged till they arrive to that state — which (Docr. Arbuthnot calls decrepitude or the 2d. Childhood, then they sleep a great deal. 8 houres is sufficient time out of twenty four for middle aged persons to sleep. — Mr. Neal in his history of the Puritans, relates a case of an Audious Clergyman. who lived to between 60 or 70 years, and never slept more than four hours, out of the twenty four. The late worthy and reverend Mr. Wesley never during the latter part of his life, slept more, than four hours per diam. The sametime Mr. Whitfield slept and no longer. The late King of Pruſsia during his latter years, slept between four & five hours in twenty four. No man of great tallents, was ever agreat sleeper. A person who once slept with Mr. Whitfield, declares he slept more in four hours, than any other person in eight; so sound that

not the loudest noise would wake him. 7 or 8 hours is sufficient for any Man. More is morbid. In sleep when perfect we have no conciousneſs of time, a moment and an hour appears the same time. A person during the reign of Henry 8th. slept for the space of 14 days, he a woke at the expiration of which time and was unconcious that he had slept more than a moment. After sleep the fanduls of the mind appear to be under the influence of gravitation.- The moral Faculties - - rise to the top, and the evil Paſsions fall to the lowest part, hence people are more under the influence of morality during the day. The paſsions regain their ascendency, and make a bargain, as it were with the moral Faculties. The understanding in the morning is the brighest, hence the fruits of morning studies are easyly distinguished from those which smell the midnight Lamp. When we wake in the morning we yawn & stretch our limbs for the purpose of perfecting the Equilibrium of exudiment and Existcabillity, which is not

yet complete. — Some people have a custom of walking before breakfast, when the system is very weak; it may do to preserve health, but not to restore it. Invalids should never take exercise, till they have eaten something as the system is very weak in the morning, hence our Great liability to fear in the morning. The Indians are well acquainted with this — fact, hence they attack their Enemies at break of day. Nature to remove the debility. We feel in the morning has filled the air with adours of the most agreable kind and with de=phlogisticated air from the resperation of vegetables at the season of the year, when we are most in need of them, the spring, — These then are the principal Phenomena — which occur during sleep, and in the act of waking (except dreams.) (Dream of — which I shall now proceed to treat, and some other Anomalous Phenomena. —

(Dreams depend on an irregular motion on particular excitement in the mind, or perhaps to an imperfect collopses of the

Brain. In dreams there is an imperfect cessation of the opperation of the mind. — In some the memory is suspended, while the immagination &c. are in action; in many dreams, the moral faculties are asleep, we frequently dream of comiting deeds, which if a wake, we would shudder at. —— Some Philosophers have accounted for dreams from the unequal exitement of the Brain in quicker or slower circulation of the blood thro' it. — How different we do distinguish Persons in our sleep? owing to the immagination not acting regularly, and without the aid of memory, — how frequently do we distinguish as to time? owing to the sleeping of the memory. For example, we often dream of an old friend and are with him in Idia transact a thousand things together, without ever recollecting that he has been dead a long time. How different are our Ideas of right & wrong? owing to the sleeping of the moral faculties, hence our vogue Idea of moral obligation in our dream. Is there not in dream an obstruction of exitement from one part of the mind, to an other, as in Fevers? ——

I think there is, It is strange that Doct. Darwin denies this part. The will appear not to act in dreams, hence, perhaps the difference between dreams & delerium, in the latter the actions of the mind, tho' irregular are accompanied by corisponding actions of the body, which does not take place in dreams. Dreams constantly depend on exitement, hence the stimulis of the morning light exite them, also that of a full bladder, and almost any active stimulus in sleep will exite dreams. — A Methodest Minister was sleeping, and a pin in is bed run into him by his turning, he exclaimed suddenly, Oh now I know what St. Paul means by a thorn in the flesh, — Doctor Beattie relates an instance of a young Military officer, who by means of some insultting words, whispered into his ear when asleep, rose and went thro' the forms of a duel, and was awakened by the report of a pistol put into his hand which he immagined he had fired at his antagonist. Do we always dream? This Gentlemen is an important question, in it the sleep

of the soul is concerned. Labouring people dream but little, many do not dream at all. Mr Parke has known instances of persons who never dreamt, and I formerly knew a Lady in this City who never had a dream in her life tho she was thirty years Old. Mr Stewart the famous Pedestrian traveller, told me that he never dreamt when he lived on vegetable diet, but as soon as he began to eat animal food he began to dream. — Mr Parke says he does not beleive we always dream. as we would think in that case without deriving good from our thoughts. — I would for my own part as readily beleive that a fever constantly exists in the blood vessels, as that we always dreamt. It has been said that we forget some of our dreams. Which a future association of Ideas will enable us to recollect, that we probably dream always and the memory acting asleep. We do not recollect our dreams; According to Mr Parke the soul and body sleep together. This opinion I have adapted and believe dreams only to take place, in consequence of

unequal action or morbid exitement of the brain, Dreaming occurs very frequently in the decline of life, old people seldom sleep without dreaming ——

We are able to wake at any ~~time~~ hour in the morning that we please. How can we explain this part? I beleive it depends on the impreſsions made on the memory, by thinking so much about it before we go to sleep.—

The memory remains a wake, while all the other faculties of the mind are asleep. We have the power of recollecting certain dreams if we please— by aſsociation, by placing ourselves in the exact position in which we were when we first dreamt it. If we are anxious to recollect any perticular dream, we can do it, by shuting our Eyes, as soon as we a wake.—

Morbid Action.

in the brain is sometimes so great as to inflame the muscles of the limbs, hence the cause of Samnombulin— Sleep. Walkers, Hence too sudden starting when we are frightened

by a dream. Haller declares he composed verses when a sleep. The Revd. Mr. Bratlark an old Gentleman of Edinburgh, a blind and sensible man, was afflicted with Samnombuli If I may use the exprission, in a very remarable degree. One evening he retired to bed before the rest of the family. The family as usual assembled to supper. The old gentleman got out of bed in his sleep, put on his clothes, went down stairs, seated himself at the table where he conversed, and eat as usual, and after supper song a pleasent song or two. Of a sudden he started up in a fright asked were he was declared he knew nothing of what had been doing, and went to bed again. His varacity puts the truth of the account beyond ~~the~~ all doubt. A young man in Paris is said in Memoris French Acad, to have written one oration in his sleep. Samnombuli never recollect when they are awake, any circumstances of what occured while they were in that state, But in the next fit they recollect perfectly well what they had said, done, and intended. In a letter from the

Reverend Docr. L——— of Springfield Maſsachusetts to Docr. Stiles, a very curious account of a disease, which had a strong affinity to that of the Samnombuli is related and perhaps may afford a clue by which his disease may be accounted for. — A young man in this Town, was standing a great deal in water had a curious disease — brought on him, some years since. It is a kind of fit that seizes him now and then at different intervals. when the fit seizes him he falls down, but soon raises a gain. But what is the most remarkable in these fits, is the extraordinary state of his mind, if he wishes to do any thing he sets himself about, it, & frequently the fit goes off, while he is in the midst of his labour, he forgets then all about it, and proceeds to do what ever he was engaged in before the fit seized him, but at the next time when he is taken with a fit, he forgets all is busineſs and proceeds with what he had undertaken before. So that, in short, he appears to have two minds. The one he only uses in his fits, the other during the intervals

The act independently of each other.

Perhaps the motions of Samnombuli depends on two minds, two states in of the brain. The seats of the two minds, may have actions independent of each other, and each may have a memory with understanding &c.

The Samnombuli never recollects any of the actions performed when in is sleep, may not the reason of this be, because the force of the impression, is not sufficient to excite the memory and rouse it from its sleeping state.

The same things obtain in monia, a person who gets an Idea of being a King or a cobler, and in one fit will forget it entirely, if he be cured, and if he relaps, the same Idea will return, with the disease. A remarkable instance of this kind happened in our hospital a few Years a go.

A person conceited he was an admiral, and ordered the people a bout him, to reeff such a sail, pull the ~~at~~ houl yards, put the ship a bout &c. &c. He recovered and the notion left him, He was brought back a gain with a relapes

and was a gain the admiral. I think it probable that drunkards have the same kind of recollection, in one drunken fit what the did. In the proceeding one tho they are ignorant of it when sober. Kempfer in his travels, relates his having been intoxicated, by drinking an infusion of a substance called peganum, by the natives of certain parts of - - - - - - - - - he was very happy while under its influence, but had no recollection of his having been intoxicated — It is remarkable that Samnombuli never feel fatigue from any actions committed during their continuence in that state. — It evinces the existance of morbid excitement in the Brain. — Why do we never dream of persons dear to us? Lovers never dream of the objects of their passions, till it begins to decline, or else in the commencement of it. This is because the excessive stimulus of thinking, constantly on the same subject, during the day wearing down the excitement of the brain. Mr Rittenhouse informed me that for seven years he was violently in love with a Lady, and he never

once dreamt of her; tho' she was the first object of his thoughts in the morning and the last at night and tho' he wished very much to dream of her. From what has been said, dreams are not the effect of supernatural agency. – It would be very suppprising if duty should ~~tell~~ condesend to fore tell the breaking a cream jug, ~~and~~ or even interfere in the most important consequences of human affairs. As for instance to direct a Genl. before an important battle, on which the fate of Empires often depends. — When dreams do turn out to be true, it is only to be explained by a ca incidence of circumstances, and is the effect of accident and blame. – The same thing occurs quite as often in the wakeing state. By this however, I by no means intend to shut up the channel thro' which the supreme being may in certain cases direct the human mind. Reason and judgment forbid such a conclusion. The buiſsneſs of a Physicion is to say what dreams do portend, at present not what as to be at a future period, a Physician may derive information by attending to dreams. The unduati as I before said irregular

or morbid exitement in the brain, he should order evacuation, temperance in eating, and drinking exercise &c. Hydrocephalus, at times is always preceeded by dreams, Children who frequently start in their sleep. Are terrified, and see in the corner of the Room somthing, which does not exist their. Are frequently effected with Hydrocephalus internus soon after. To point out the smalle cause of sleep as needless, the part has elegantly called it. ——

Tired natures sweet restorer. —

It alliviates all the cares and trobles of life, it is equally, acceptable to the wretched and the happy. And is enjoyed as I before observed most perfectly in a recumbent Horrizontal posture, But some are able to sleep sitting in a Chair, and even standing upright. — The next subject on which I have to treat is aliment —

This you may say is not strictly a Philozophical subject, but as I must treat of Chyle blood and of digestion, it is necessary to say a few words on the substance, of which blood is formed. Aliment is a very important thing for a Physician to understand

It is one on which he is frequently consulted, and not to be able to direct, as to its quality and quantity is - unpardanable. In his Cooking too, or the mode of prepareing aliments: he should not be unacquainted with.

I shall therefore make a few observations on that. It iſ almost as neceſsary as the preparation of his medison, - and time being advanced I defer entering on the subject till my next - lecture.

Lecture 16th..

Chapter 11th.-

Aliments devide themselves into two kinds - Anemal and vegitable. —

That both these Classes were originally for the use of man, and his propper food. I infer first from the structure of his teeth, which are unlike cam= = or granevarious animals are a compound of both, and from clementary canal, I infer from the Ill health which follows, an exclusive use of of either species of diet. Thirdly, by a plaintive injunture laid on us by the old and new testament to slay and Eat. In it too we follow the example of our saviour, who eat flesh. — Let us not suppose there is any cruelty in distroying anamals for the table, it is a gift of our flowing goodness. By the defect thus acasioned room is left for thousands more, which never could have existed for want of sustinance, had not their ancessors been distroyed. — We must consider it an act of benevolence. — The knife releeses animals from all the diseases and infirmaties of age. — Few anamal but man survive a disease of any force, — again, no animals suffer pain from an Idea of a future state. A bodyly and momentory pain is all they suffer as their exit from life. A man suffers more from a fit of the

Gout or stone, than any animal by being killed. There is scace an animal in creation, weather bird quodruped, fish, or even serpent, which has not at some time afforded, not only food, but a luxury to man. This revokes us not to consider as intruders, any animal even lothsom as worms. they are all created, for the use and conveniance of man or of their animals. —

Let us consider the property of Aliment necessary to render it wholesom, on this subject, so much has been said. — I may premise. 1 — that the moderate use of all Aliments, which is palitable, — and which sits easy on the stomach is wholsom. — Take notice Gentlemen, I shall speak off the harmony of the Mouth and stomach. — Many aliments please the taste which excite nawsia in the stomach, such are not wholsome. (Doct. Fothergill in support of this opinion relates an anecdote of Lord Mansfield with whom he used to dine, now and then his Lordship frequently enteragated the doctor with respect to the wholsomness of the food, his reply was, does your Lordship? — Yes, then it

is certainly wholsom. ——

Much of the most unplatable food is capable of easy digestion, and forming good Chyle. 2nd.. There are some aliments which do not show their ill effects on the system. Till some years after they have been swallowed —— 3rd.. Particular causes certain aliments of very easy digestion to most people, and indigestion to others. 4th.. — The time of life has an influence on the wholsomness of food. — Butter is to many people at certain ~~times~~ age unpleasent, yet in general it is a delightfull part of diet. — So that the same aliment causes in this respect at certain ages — 5th.. Hobet has a great influence of aliment rendering us pleased with such as are unpleasent at first, and the digestive powers, as well as the oppesite. This remark extends. Fat pork for example becomes both agreable and easy of digestion to persons to whom it was at first - unpleasent, and unwholsome. — These remarks being premised. I proceed next to notice the different times when aliment is taken. — In this country, as well as among most —

civilized nations. Custom has established 3 or 4 meals times, as the are calld in the twenty four hours. This accords best with the convenience of our occupations, but I suspect man like the horse was deseigned to eat always, or at least little and and often, so as to keep the stomach continually. And the impression of moderate distention, the inconvenience attendant on the long intervels of time between meal times are most observable in children and old men who have ~~arrived~~ arived at the second childhood. The cannot pass the ordinary time without hunger. — The Indians eat little and often. Mr. Bartram informs us that they frequently raise from bed to eat, this method keeps the system under a more constant influence of stimuli, and allows distention to go on with more ease and the stomach to be evacuated of its contents, and the impressions on the nerves and circulation is more uniform. — The languor arrising from the long intervals between meals, has given rise to the use of ardent spirits, tobacco and opeum to supply the place of food. — Custom has rendered

necessary for us to make one principal meal in a day. Disputes have arisen concerning the most proper time for this meal. In my opinion, the roman custom of having it in the evening, is the best after the various fatigues and labors of the day. Digestion is promoted by rest after a hearty meal, and the night is the most convenient time on this account, perhaps about eight o'clock in the evening. — This argument will not be so powerfull or faviourable, when we recollect that rest should not be horozontal. — The Portuguese it is said lay on the floor after dinner, but it is not in an horozontal position, the rest themselves back against a wall, and support themselves between two chairs. — Augustus used to lie down to sleep after dinner, but he slept in his chair. In short people who make a practice of sleeping after dinner, always rise sick, ill composed, or stupied. A very common custom, is to drink bitters, before meals, this I think highly prejudicial to the appatite, which it frequently distroys or makes so keen that

we eat ~~too~~ more than is proper. The Indians well know this part, that drinking before meals dis=troys the appitite, hence they never taste even water before dinner, during their long marches. A much better mode of invigorating ourselves before dinner, is to eat gingerbread, figs, reasons, or the like, it does not distroy our appitite, enables us to wait the accustomed hour. It is customary also to drink at meals, when we perceive the appetite to flag, it reexites it. This I conceive to be injurious, it makes ut eat more than we are accustom to eat and impairs digestion, by deluteing the gastric juces hurrying the food through the alementory canal before they are perfectly digested. Craving food is a nother custom which I disapprove of. = The apprator to a quartor of an hour labour impairing his appetite by wearing down exi=tement, as men are usually debelitated before dinner, and subjects him also to the inconveni=ence of swallowing his food, before he has mas=ticated it properly, to avoid the suspicion of be=ing ill bred, by being longer at his dinner than his neighbors. He must enter into contact

with Goose or a turkey which fatigues him so much as deprives him allmost all pleasure from his dinner, not to mention the damage done to clothes and table clothes. The Chines, and of late years, the French have been in the custom of disfiguering the shape of the victuals which the present you ~~with~~. So that you forget, that you are dining on an and perhaps a usefull animal. — This Idea, Anthony Benezet could never bear. The Chinese neither use knves or forks at their tables, which is certainly an improvement again. — The obsurd custom of drinking healths, subjects one to contimued interuption to return thanks, and also make us drink more than we wanted to do, to interrupt rudely our Neighbors intent on eating and arrist them with good wishes for their health. More over it breaks the silence, which I have elſe where observed is nesceſsary, for the perfect injoyment of the sence of taste and their distroys our relish for food. —
The wholsomeneſs of aliment depends on its salubility in the Gastric juces or on their

stimulabelity. The nutrition they afford arrises - from the former, the following circumstances infuence the satubility of aliment ~ — 1st - Sex Females of all animals are more tender and easy of digestion than males. - Castrated Animals, more then those which retain marks of their virility, if I may be allowed the term - Hence Capons are prefered to Cocks, and oxen - and wethers to bulls, and Rams, Age has a great influence on the salubility of animal food. Adults are more stimulating and more easy of digestion then young animals. hence beef and mutton are easier digested than veal or Lamb. Mutton is at perfection at the fifth year. - The preemenence of the Scotch and Welch is in keeping it till the seventh year. - The time in which the animal has been preparing for the slaughter House, and the method used materially; Satubility divers of food, they longer they have been fattening, the more wholsome is the food. The superiority of fresh food consists in their keeping these cattle two years fattening on porter grounds - hence too

+ they are fowls. # this is incorrect this kind of exercise renders animals more insoluble especially fowls. as the bruising render the muscles rigid —

they injoy the prevaleige of excercise which is the fourth cause of influenceing salibility of animal food.— exercise has a powerful influence hence we find wild birds and beasts, mach more tender than domestic animals, Hence too Epecures have invented the practice of Bull Baiting and hunting to make the animals more tender* Cockfighting hence derives its oragin. This meat is so saluble that it passes too readily through the intestines, hence we find people, who live on wild food, less able to work. Then those who feed on domestic animals.

5th " The quantity of fat in meat renders the lean of fat meat more easy of digestion. —

6th " The length of time which aliment is kept before it is cooked has a great influence on salubility. There are three exceptions to this rule. Geese, Pigs and Ducks contain an oil, which becomes rancid, if kept more than two days, and renders them rather unwholsome. The are best the day after, that which they are killed. Turkeys and fowls do not contain an oil of this nature

In summer meat cannot be kept with convenience more than two days at farthest, in winter a week is common. In summer Ice houses are very useful for this purpose. When they are not to be used. Cold springs of water, or wells answer the purpose very well; the meat may be kept for a week in July or August, in a well or cold spring, the outer part being cut off the blood runs as if just killed, if it be dreſsed a few hours, after it be taken out of the water, it is very tender. - Where there is not handy a dry dock. Cold celler should be used. Docr. Clavet when in Jamaica used to kill his animals, by bleeding them in the corated artery. And inject into that veſsel after the blood has evacuated, a quantity of salution of salt very strong, this preserved the meat in a remarkable manner.

7th. The salubility of animal food, depends very much on its being well cooked. Raw meat, and meat imperfectly done is very difficult of digestion; all the redneſs should be distroyed.

8th. The salubility of animals food, depends on the manner in which the animal is killed. — According to experiments made by Doc. Franklin. Those killed by electricity, are more tender than such as have been killed in any other manner. — This the Dr. explains. from the disorgonization which it produces. —

9th digestion is much facilitated by a complete mastivation of food and mixture with saliva. — A very bad practice prevails now of preserving poultry, with their entrals in them, it hastens putrifaction, and the flesh always acquires a tint from it. — The Light of the moon, has been said to produce a tendency to putrifaction. — Fish kept by moonlight in the west Indies, are said to putrify very speedily. — This observation made by Dr. Lynch in the West Indies has been confirmed by Dr. Balfour in Bengal. — How is this effected? Perhaps it may be oweing to the succulinary of the animal. — but is it not more probable, that the light of the moon, enables flies and other insects, to deposit their Eggs, and thus hasten Putridity? Crabs, Oysters, Lobsters and Clams

are fatter at full moon. — We next proceed to the methods in use of preparing animal food for use. The 1st is in form of soup, these are in use in most nations. — The Scotch have their Hodge, Podge" + Cockalukey" "black soup. — The French have their Fluid aliment, in form of soup. Gron and "Soupe", maigre, another favorite. Seach dish is Baily broth. This is made by boiling a peice of meat the closer the better in water, and throwing into it a quantity of barley, herbs, and these are hadded. The make, the cockalukey (a very excellent dish, By boiling a cock as old as they can procure him that he may retain his form the longer. The boil him in a pot of water together with beets, leeks or onions, and if a peice of beef his handy they throw [illegible] that in and seson the pot, this is boild a long time, and if necessary fresh water added, and a very excellent soup is the product. The name derived from the ingident, — The cock & leeks. — Their hodge, podge, is made in the spring, by boiling mutton, with every vegetable which their Gardens afford. Beets, Carrots, turnips, pottatoes and the like, and in some

cases it is a very palatable dish. — The French make their Sant, Grou, by boiling five pound of Beef, and eight pound of water down, to four pounds, over a slow fire, in it is disolved four oz: of butter, and ~~&~~ vegetables and seasoning are added. — Their soup Maigre is made by boiling four pounds of Beef, four of Bread battered, four onions, four leeks — Turnips, in eight pounds of water, for four hours, rith fire, sufficient to make it boil away to four pounds of Liquor, it is seasoned and boild again to separate all the fat that may arise, this is done with great care, as fat is very unpleasent and not easyly digested. — In making soups, the longer the meat is boiled, the better, as the musclagenous and Glutinous parts are more completely extracted. — Four or five hours over a fire sufficient to make them simmer, is the best mode of boiling meat, for the purpose of making soups, the pot should be closely covered, and the fat skimed off, toward the end of the process as much as possible. — I said four or five hours, but a longer time would be

still better. — For instance, from 7 to 8 in the morning, till two afternoon. —

A second mode of cooking animals food, consists in boiling it. — Boild meat is less stimulating, then when cooked any how else, It is proper for ayoung people convalescent from diseases. — Mutton is agreeably cooked by boiling, and strange as you may think it, (Ducks & Geese eat much better cookd this way, as the are deprived of their oil. —

Roasting is the most usual mode of in dressing meat in general; it is most savory and pleasent to the taste. More stimulating in nutriment. The Patriarch Isaac probably ment this mode of cooking, when he desired his servant to make his meat savory, for roasted meat is the proper food for old people, and such as are afflicted with weak stomachs.

E. Brailing, in this manner Beef stakes are dressed, also Mutton chops. — The great art of Mrs Peg Muller, whoes fame for cooking a stake was unrivaled in this City, consisted in exposing the Beef to a strong heat at first, so as to astringe the outside of the stake, and retain the juices. The perform this by, claping the steake ~~not~~ not as in common on the gridiron —

But ~~on~~ an Iron plate, such as is used in baaking buck wheat cakes – – The in Cornville are acquainted with this ~~fact~~; and ~~baak~~ roast their Steaks, by puting them on a block of tin, at the moment of its passing from the fluid to a Solid state.

5th Baking, this is usually done with a past made with flour, in the form of a Pie. – The meat is well cooked and easy of digestion, but the crust is unwholsome, and sits heavy on the stomach –

6th Horhes – Dr. Franklin says the best mode of cooking Mutton; is to roast it, then to have it boiled and made into a hash – the differ little as to stimulus, or nourishment from.

7th Stewed Meats. These are more nutrilent than boild, tho' less then roasted – less of their mucillage and juices wasted, then in boiling they are not so compleetly preserved, as in roasting. –

8th Frying, Hogs lard and butter, is used in this mode of cooking. Bears fat is preferable perhaps to either – Fried meat is considerably stimulast – and lastly by hot vapor of water. this is performed by placing the meat in a pot, which is placed over a nother pot, containing water –

fire is placed under the lower pot, so as to make the water boil; the meat is thus involved in a quantity of vapor; and is said when cooked to be very tender.- Haveing thus mentioned the circumstances, rendering animal food wholsome, and digestable. I - proceed to say a few words on aliment, which appears intermediate, between animal & vegitables Vz Fish. - This says Dr. Haller, was the first food of man, as his inocence led him to eat that animal; in preference to any which expired without a groan. - Theese do not differ in quality by age - but punually by the time which elapses between their death, and their being eat. - The sooner - they are eat, the more wholsome. - as the are more putriſcent. In Holland they are sold alive, as they are more stimulent, then animal food and promote perſpiration, they should be used by convaleſcents before meat, the are easy of digestion, Oysters and Clams afford nourishment, tho they are not very stimulent, and easy of digestion but eat without much cooking; clams are generally boiled in soap; hence they are more stimulent. - Lobsters and crabs contain very

little nourishment the usual mode of cooking fish is by boiling; the mode of telling when they are done; is to observe the time when they float on the water; if the boiling be longer continued they fall again to the bottom. — Fish should not be eat with any other meat unless, a slise of Tangue or ham; which is of no detriment to digestion. — To Invalids, a diet of Fish with tongue or ham is very propper. — It has been a Rule in the Old-est established Church, the Cathalic to obtain during 40 days in the spring, from all other food then fish. — This lent is a wise institution and should be adapted by all the different sects of Christians. — It comes at a time, when the diseases of Plethora prevail, and is of use by reducing the quantity of nourishment. ——

2ndly It prevents our eating land animals at a time, when they are not wholsome. But when they are propugating their shews. ——

Candements. assist much the digestion of Animal food. — and are used by mankind for that purpose. — They are first common salt a taste for this appears innate, in the Human

species. — Children early discover a partiallity for it. Heat, May I not mention heat as a condement? aliment, is certainly more pleasent when eat warm than cold. — Common salt is only pleasent to granuvicaous animals. — The Indians substistute, ashes in its place; Salt promotes disgestion ~~better than any thing~~ a spoonfull of salt after dinner promotes digestion, better than any thing I am acquainted with. —

2nd. Vinegar ~~it~~ This is a condument much used, when in moderation, is useful, and stimulates the tongue to more acute perceptions of taste. — Pickles are venegar in a solid ~~state~~ form. — Pepper, Mustard, Horseraddish — and a few more most stimulating vegetables. I think very injurous unless used very sparingly. Ketchup. is used with fish, made by digesting mushroons with common salt, two or three days, then boiling them, adding spices of different kinds; ~~t~~is a pleasent condement with fish; but is seldom used with any other aliment. — The English have taught us the too free use of them, as a condement. After fish, a Glass or two of Wine is useful. —

But happy his he whoes stomach has no need of such a condement, having thus treated of animals in general - I shall next proceed to the me=thods of prevencing it. - They are numerous. - 1st Heat of the Sun, in the manner the In=dians preserve their vension - It acts by ex=haling moisture from it, - without moisture puri=faction cannot go on. - A peice of Sugar would not forment in 100 years. - a salution of Sugar in the course of twenty four hours in summer - at sea this method is often practiced. - Stock fish are prepared by it. - 2ndly By frizing - This me=thod is used by the canadians, to preserve fish. They must be throwd afterward in cold Water. - 3rdly By sugar and Malasses. - 4thly By preserving it from the air, as by sand & flowr. - 5th By Sm=oking, this hardens the meat, and appears to possess an arti sceptic quality. - 6thly and most comon=only by common Salt. - A small quantity of this appears to haston, putrifaction, while a larger, evendently prevents it. Nitre assists much in the process, it gives the meat a much better colour, and also renders the meat more salable - Meat preserved by

common salt is more stimulant then fresh-meat, hence of use in certain diseases, but especially in convalescents from below, and intermitting fevers, and other acute diseases. — Another mode of preserving Meat was mentioned to me by an old East Indian Sea Capt. It is to cut the bones. — As he observed the Meat to become tainted, first near the bone. — —

There has been a variety of methods used to preserve Hams through the hot weather. — Ashes, Bran, sawdust, sand, and even whitewashing them have been tried. — An intelligent country Gentleman informed me that the best mode of which he found, and he had tried all, was to place they hams deep and separate, in fine cut straw. —

Lastly. Patent soup, this is made by evaporating a decoction of meat, till it becomes solid It requires only to be boiled in water to form a very good soup. — Man is the creature of habit and happily formed by nature to live on almost any thing, in the form of a tortise, he has been known to open the jugular vains of many a goat or sheep, and make a hearty draft of his blood —

In Patagonion he has eaten the flesh of is fellow men. – Torties are infinitly various – there is an account by a society of Philadelphians Settled at St. Domingo of some Negros who dug up with great avidity the carcases of Putrid animals and devoured them gredily. – Some are best pleased with birds of pray. – Persian lives principal part of the year, on dates and figs – and Truxonfort informs us that the Turks at constantinople live during the summer on little else than Cucumbers. –

This difference of taste is not exclusively confind to human species. – Spalanzami, has made Eagles eat bread. – and Young Pigeons eat meat. –

Aliments differ in quality in Proportion to the various proportions of Sugar, oil, and mucillage or gluten they contain. – 1st Sugar is the most nourishing of the three, this has been proved by experiment. – two Pigs of equal age and weight were fed, the one on Pottatoes, the other on Parsnips weighed in a given time Several ounces more than the other, hence persons who are about to travil and expect to be scarce of provisions had better carry a quantity of sugar with them. –

Hence the date is nourishing, figs, raisons. - 2ndly oil whither ~~g~~ vegetable or animal is nourishing, olive oil is used as food, in the East Indies. One pound of fat meat is more nourishing then two of lean. Hence from Economy, Persons who have the direction of Iron works and other places when a large number of Men are implyed, feed them on pork, as it contains much fat. 3rdly Gluten is the least nourishing of these three principals. — Gluten by Chemical opperations may be obtained in separate state as much from wheat or Pottatoes. —

Dr. Morgrove long ago separated sugar from the juce Beets, it exists in many other vegetables then the sugar cane. During the revolution some farmers in Jersey extracted large quantities of it, from the extracted juice of corn stalks when sugar was very scarce, their method to evaporate the juice to the consistency of molasses with which they sweetened coffee tea &c. — All vegatables is therfore nourishing in proportion to the sugar they contain, next is the oil, and lastly Gluten. — It is said the Prussions procure Sugar in large quantities from turnips. — What is the proper

quantity of food for a man per diem? - this varies according to many circumstances. - Children require more food than adults, and old men more than middle aged. People who labour more than those who are sedentary, and all men in winter more than somer eight pounds ~~of~~ are allowed to be the quantity for a moderat labouring man, allowing half to be animal and half vegitable, this I am perswaded is more than they have any accasion for. Mr Volney informs us that in some parts of Turkey, half a pound suffises a man per day, and that of the most insiped vegitable kind, from four to six pounds is my opinion the quantity for a healthy adult, - habit renders more necessary, and habit would soon make this quantity agreable. - It is probabe we eat less for nourishment than for Stimuli. - This I infer from Stimuli supplying the place of food. - Fever affords a Similar exainple. - Aman is supported without any Aliment for many days in accute without loss of strength. - also the stimulus miormati and contagion renders food unnecessary.

What is the proper temperation for food? I think the most natural is warm Indians we

observe, prefer warm to cold food. Heat of course makes aliment more stimulating. — Whither to, I have said nothing of tea or Coffee they afford no nourishment, but what is derived from the sugar. a cream used with them; they are perfectly on the system that the medicene of the Brain and nervis. — Coffee acts principally on the Brain; tea on the nerves and muscles. — The former in excess produces vertigo, the latter, tremor. — They are certainly of great use in preventing the drinking the ardent spirits. — Tho much has been said against their ill effects on the system, When used in the following cases, they do no mischief but much good. — 1st. In cases of great fatigue either of body or mind. — Tea or Coffee are a pleasent restorative and exhilarates the spirits and strength. — 2nd. In cases of great grief Coffee or tea is useful remedies, and in other depressed states of the mind. — 4th. If we wish to remain watchful, the best medicine is to take strong tea or Coffee. Hence studious people frequently have recourse to it in evening. — 5th. Strong Coffee has a peculiar power in guarding us from the cold. — A Country Physician

informed me that he never took a long ride in the cold, without drinking a pint or quart of strong coffee which effectually guarded him from cold, a person told the Father of Anthony Bennezet he thought tea a slow Poison. — yes replied the old Gentleman I think it is, for I have drinked it these fifty years twice a day, and am not dead yet. — It remains further to   of drinks These are best fomented liquors. Wine and Cyder   Molt liquors, as Porter Beer and all such as are produced from Barley by Malting. —

2nd Ardent spirits or distilled liquors. As Brandy, Spirits, Rum whiskey and the like. — 3rd simply water

1st As a compound containing Acid, Spirits, water sugar and an unformented must. — They nourish in proportion to the sugar they contain. Hence the sweet wines are the most nourishing. As malaga, Constantia. — The next in point of nourishment, are the red wines, Madaria. —

Port, Sherry, Clarret, Burgundy. —

The order in wine is Stimulate is some what different from what they nourish. — The low red wines are the least stimulent, But in small quantitys

pleases the palate best, and is the wholsomest. - It has never been known to produce the gout. - The gout is unknown in Madaria, and they Inabitance of that Island, consume annually 70000 pipes of that wine, when the weak wines tend to acidity. - Brandy is added, which prevents it. ~

The French ads to thin low wines. Lead when they become sour. - The acid unites and forms a compound of which sweetens wine. - The often prove a slow, and somtimes a sudden poison, It may be diluted by adding orpiment to the wine, this is composed of sulper and arsenic. a muddy precipitate falls down, if the wine contains lead. - If wine be two sour it may be corrected by ading sugar, but before it is used, it must stand in a cool cellar or vault, and not moved or other wise it disposes to ferment. - When wine spontainously becomes muddy, it is restored to its colour by ading sol So dai which unites the fumentates matter and precipitates it. -

Lecture 17th.

We proceed Gentlemen with the subject of wines. They should be kept in a warm dry room, gentle agitation and wormth causes a kind of precipitation of any overplus of sackorione matter. — Hence wines are improved by Sea voiges and land Carriage. — Wines are seldom fit for use, till the forth or fifth ~~month~~ year the older they are generally the better, as it fines itself perfectly by being at rest. — This process of fineing may be performed, ether by mechanical or Chemical means. — The first by brown paper or sand. — This is by seizing the ~~matter~~ particles of matter which make the wine muddy. A particle of sand for instance, coming in contacht with a particle of this muddy matter, to which it attaches, and they sink together to the bottom of the cask. — The second by the white of Eggs, milk, or blood The act by entangling the Flauculent matter at the moment of their coagulation, by the acid of the wine — And falling with it to the bottom

of the cask. — Wine deposits spontaineously a redish coloured substance at the bottom, and round the sides of the cask in which it is contained — called tartar. — It consists prinicipally, it consist of tartarious acid — The cream of tartar is prepared from it. The genious call it wine stone and use it as a ferment in making vinegar, they add it to their Cyder & wine for this purpose, in consequence of this depositition the wine becomes less inflameing and wholsomer, — Hence we explain, why wine from the cask is wholsomer then bottled wine. — And hence wine never improves after it is bottled, owing to the circumstance that Tartar is only is only deposited on wood and not on Glass. — next on malt liquors. —

Malt Liquors. These contain some spirit much Sacharine matter and great propotion of water — from the sacharine matter they contain, they can-not but be highly nutricient, Hence they are much used by the poor of England and Scotland. — For labouring people they are a very proper drink, but for people of Sidentry lives they should not be used. Cyder. This ~~shoul~~ like

the colored wine wich abounds with acid is apt to produce Gout and Rheumatism. — Of the malt liquors Porter, I should prefer, as its parts are more intamately blended then beer &c. When Cyder is wanted in its best state, the method is to bail two barrils into one, — keep for four or five years and is avery wholsome and agreable liquor. — Ardent spirits (or distilled spirits (consist of spirits and water. — And no Sacharine matter they are unwholsome in every form perhaps less so in punch, the acid is blunted by the sacharine matter and the adition of lemmon juice renders it equal to the low wines. — To perscribe the evils produced by this baneful liquor, would require a thousand tongues and each armed with all the force of ancient moden eloquence. — This is not the proper to enter upon this subject. — Lastly, pure Water, this Liquor will ever retain its charector for Salubrity, were we confined to any perticular drink exclusively, water would be the most agreable, and nothing but water can alley our thirst are we burning with fever; nothing ~~but~~ so desired as water

to cool our exceſsive heat. have been intoxicated with wine or spirits; nothing so cordial as water to our angry and offended Stomach. Let such as poſseſs a taste for this unadulterated, learn to estimate the inestimable bleſsing, which leads to health and long life. Let us next consider the causes of appetite.- 1st. Baerhave ascribed hunger to the action of the internal Coat of the stomach.

2ndly He thought it in part oweing to the bile in the stomach, and lastly to the Stimulus of the Gastric juice, and the Reliquæ of the former meal.- All these causes I grant may ~~render~~ induce morbid appetite but a natoural hunger opened the stomach of a robber famous for the inordinate quantity of his food,- and found the ductus communis Choledochus emptying into the Stomach, but in common natural hunger I beleive the Stomach to undergo a certain degree of relaxation, till it arives to what I have called the hungry point.- When it is below that point, anorexia or want of appetite comes on; in this case stimuli excite appetite Hunger when acute is a most violent disease in it there is great pain, not only of the stomach but

the mind, especially the moral faculty, it has been said to breat through stones walls, but it has done more, — through the medicine diseased moral faculty it has ~~been~~ induce mothers to kill their children, and make food of them, this is not all it makes people eat their own flesh. — Sailors who have suffered shipwreck, have been known to eat their shoulders for sustinence. That a certain degree of relaxation is attendant on hunger. I infer from the effects of certain passions which suspend it such as shame, Feer, Greef and the like. — The act by releiving the debility and relaxation or by reducing the system below the hungery point — here we see it resembles sleep. — Joy, Cheerful company and pining raise the system, frequently above the hungery point. I have heard people often remarke that they felt hungery after having been four or as five hours at the dinner table owing to the cheeful company and conversation keeping them above the hungery point. — I do not deny that the Gastric juices Bile and fluids may stimulate and induce hunger. — But I beleive appetite then to be morbid

morbid

thus in case of yellow fever. — Patients who have the black vomit eat very hastily now and then probably from this cause. Again — in Hunger excitability is increased. Hence the death of Mr. Otway the poet from eating a loaf of bread. — Is this very excitable state brought on by fasting. Smelling food renders us incapable of eating as much as we otherwise would do. — Many opperations of the mind suspend hunger, as is the case I before mentioned of Lord Mansfield. —

Let us next inquire into the cause of thirst; — The seat of thirst is the mouth and fauces, — this I infer from certain moist fruits and other substances allaying it, the causes which excite thirst are either general or partial ———

1st A certain acrimony of the fluids produced by fevers, and after a suppression of urine, or by eating salt meats. — The first acts generally on the system and renders fluids necessary the last acts partially. ———

2nd A relaxation of the fauces accompanied with dryness and debility to the degree I have called the thirsty point. ———

3rdly From aprum digetalies and some other medacine, which induce indirect debility and thirst.

Having thus treated of aliments, let us next enquire into the change they undergo before they are converted into blood.— Aliments received into the mouth are divided by the action of the tuth— And so as to become mixed with the sallivа from the Porated.- Submaxillary and sublingaeal Glands.— the tongue performs the important service of an mortication of pushing, the aliment about the mouth so as to expose it more completely to the action of the tuth.— And then protrudes it to the Eligeutis and thence into the Esophogas whence it passes into the stomach where it is to undergo the process of Digestion. how is this performed? It has been attributed to two agents.— The one mechanical the other Chemical. The first on Mechanical by tritusation. The second by heat. Salation, Fomentation and putrifaction.— On each of which I shall proceed to remark.—

Much has been ascribed by Mechanical by Philosophers,

to tituration in digestion. (Dr. Pitcairn has computed the force of the stomach in digestion of 12950.lbs — Dr. Barchous calculated all the forces used in digestion, that of pulsation of the heart of the diaphragm in resperation and unheeded even the pulsation aorta. — That tituration notwithstanding these calculations does not influence the proceſs of digestion. — I infer from some experiments Spollonzani he swallowed twenty five Grapes and of them eighteen were voided without being broken. he repeated the experiment with Cherries, and with the same result. — If the force of the stomach was not sufficient to break the tender skin of fruit, it can have but very little influence on digestion. —

Next the chemical agents in order. — Putrifaction I reject alltogether from digestion, it renders aliment unfit for Chyll, and we find from experiment that any substance which is taken putrid into the stomach is corrected before it is digested. Heat. Solution and Formentation, I admit tho the ~~the~~ latter is not so generally received. —

That Heat, is neceſsary I infer from —

which digest in two hours in Summer as much as they do in two or three days in winter or cold weather. — Again heat must be present for the proceſs of fermentation and solution. — The gastric juices is capable of desolving of the temperation of 44° but the Lobe it is the more the salvent powers are increased till the 112° at which it appears to be perfect, this is a few degrees more than the Hunnon of Stomach, Spallanzai has proved that at a heat of 96° Gastric Juice desolves more than at ~~even~~ 20° below in the first substances were desolved in twelve hours which in the latter it required two or three days. —
Mr Hunter has proved two, that what was disolved at 68° in the frog .... required at 35° or 40°
12 for a Salution Salliva aſserts the soluti.
Solution of our aliment as well as the Gastric juice. — Spallazani is not intitled to the honor of this discovery. Haller mentions it in his great work thirty years before Spallanzani. Salution differs in different animals. Those which have Gizzards have leſs motion for Solution than other animals. —

perhaps the disolving power of the human Gastric Juice, exceeds that of any other animals. — In very old people and Children it is the most complete — For the aſsistance to Salution from mastication, as leſs in those than in the middle aged adults (Dr. Stephens of St. Cru has proved the aid of trituration in aiding Salution fully. (Dr. John Hunter says the Gastric Juice disolves the Stomach after death. This I doubt. — I think the appearence he mentions must have arrisen from previous inflammation and mortification. — It as frequently occurs in the bowels as in the Stomach. Spallanzani found that digestion went on in the Stomach while it kept warm. The Gastric Juice affords by analysis. Amoniacal Salt and Phosphoric acid. —

This acid curdles milk in the stomach of Children and Colues, — those these are many other substances cappble of producing this coagulation, — the liver, longs and heart of a Turkey do it, — also fish even when alive, Somoe vegetables also poſseſs that power as the Artichake leaves, and the have no acid. — The first thing therefore neceſsary to digestion is Solution (aſsisted by heat). —

3nd Fomentation.— This I know is objected to by some - but there is generally as much fashoun in opinion as in dreſs — This is old fashioned but I beleive true by fermentation. Hatrogenious substances become blended, by a motion in the fermentable matter which renders them Homogenious and a new compound is formed, Animal, Vegetable and menneral matter are capable of undergoing this proceſs.— Fermentation divided into three different Stages in vegetables they succeed each other Vinous, Acetous. and Putifaction, but I doubt whather they do in animal or minaral substances.— Some have aſserted that certain Animal matter undergoes the vinous State, but this is not certain.+ It certainly does undergo the Putrifaction and Acetous. (Dr. Smith of Biringham say he detected spirit in Animal matter, under fermentation in two days in hot weather.

The following circumstances are necessary favourable to fermentation. — 1st Heat. This should be from 72° to about 112°. 2 by moisture is indispensible. — Sugar the principal disposed to vinous fermentation may be kept 100 years from

fermenting if dry 3rdly Air — 4thly Rest or perhaps moderate motion may facilitate it as it does digestion 5thly Fermentation is quickened by certain substances called ferments.—

Here for this requisites for fermentation is in the stomach. — I shall 2ndly consider heat, this no one will deny is in the stomach. It is about the proper temperature for this process. 2ndly moisture this the saliva and Gastric juice supply. 3rdly — Air, it proceeds along with the saliva. — 4thly — Digestion is known to be facilitated by rest or gentle excercise. — Violent motion retards its way much. — And 5thly I think the saliva acts as a ferment in hastening Fermentation, to prove this I made the following experiment. I took half ounces vials one filled with water, the other with saliva and into each I put apeice of Bread and of meat of qual weight were placed. — I surpased both ~~with~~ to the same degrees of heat in a sand both that of the Human Stomach at 96°. the mixture of the saliva have some motion in five hours. — in seven it was evidently Sour — and in twelve quite putrid — that in which the water was used

remained till the twentieth hour, before any agitation was perceived — I repeated it the second time with the same result. — That the saliva is necessary for digestion. — 1st from the quantity secreted which is about 12 ounces in a day. — Secondly from the indigestion which follows the want of it from chewing tobacco. I am not singular in my opinion concerning the ferment of the saliva — Stahl Baerhouse - Huffman & Macbride all thought it sunk. — Wether to Gentn I have used only persumtion or argument in establishment of my opinion, but I shall now add one experiments mode not our dumb bruits, as those of Spallanzani. But on my own Stomach in perfect health. — I first took a few grains of salt of tartar for the purpose of nutrilazeing any acid that might exist in my stomach privious to the experiment. — I dined then on Beef, Bread pease and small Beer — three hours I took two grains of Emet tartar and emptied the contents of my stomach which were evidently acid to the taste and colors an infusion of blue vegetables red. — In my second experiment I dined on Veal & pease Bread

and water. After the precaution of salt of tartar and in three hours I vomitted and they were acid as before; in my third experiment I dined on poultry, Cabbage and unleavened bread, and the result was exactly the same. - To avoid however the ~~superstition~~ supposition that these circumstances aron from any Idiosyncrasy in me. - I obtained the use of a healty young English Student of medicine for the same experiment; He dined on duck, - Beans and small Beer. - The same Acid and erations were again observed, Viz. the sour taste and red color to blue infusion. a Gum on wister, Dr. Gop observes that the Acid might have proceeded from the decomposition of the Emetic tartar. - This I think is observed if two grains of it could never have yeilded a sufficient quantity of acid to sour the whole contents of my stomach. I agree with Spallanzani that the Gastric Juice is the Principal Solvent of our Aliment but not all together, and independently of the fluids, conceived in digestion. - If it does there is no other menstruence in Nature which posseses so universal a Solvent power and no

fluid in Chimestry is capable of the manner in which the stomach does.— out of a number of matters it uniformly prepares one peculiar substance Chyle— here I think the other fluids must have some agency in digestion.— The base of the Gastric Juice is Phosphoric acid, this hower was not the acid disingaged in my experiments.— Experiments too prove the acid to be various, and prove that spirit of wine may be obtained from the contents of the stomach, are all that is wanting to confirm most positively, this theory of digestion. I next proceed to take nature of the Phiniminus of digestion.— They are first slight fever following a very hearty meal.— It is occasioned by an over proportion of aliment, but it is by no means necessarily connected with eating.— A preternatural degree of heat, and with a gentle Perspiration it goes off, it is because the excitability is not proportioned, that this effect is owing.— Hence people before being exposed to cold, should make use of this method of obsudiing any ill effects from it—

a hearty meal.— This I recommended in a pamphlet I published during the revolution entitled directions to Soldears to preserve their health, in it I recommended that no man should go upon a Centinals duty, without eating a hearty Supper before hand —

2ndly A full meal disposes to sleep by inducing indirect dibility, this may be relieved by snuff, Chewing and the like or wine smoking &c. This is not necessarily connected with a moderate meal, has not this effect. — —

Lewis Carnaro informs us us that he never felt sleepy after eating, since he adapted his temperate mode of living. — 3rdly The mental faculties are affected by a hearty meal this is not necessary to eating, but only arives after too much has been eaten. L. Carnaro could relinquish his Knife and fork, for his Book, or pen without any inconvinience, he had lived comformable to reason and Nature. But by it he attained good health and extreme old age. — 4thly A general disposition to rest occurs after a full meal.— This favourable to fermentation and of course digestion.— The moderate exercise

is compatable with it — These are all the principal Phenomina immediatily observable after eating: and leads to respect our observations made before — that weakly persons espicially convaleſsents or invalids should never over eat themselves. — Carnaro who lived by weight and measure, brought on a fever by exceeding his usual quantity two ounces. — How many instances of paleneſs apaplexces and even death from hearty meals? In short I am seldom called to potint labouring under cronic complaints, but what I direct six or seven meals ~~a day~~ instead of two or three. The Paſsions of the mind influence digestion. The stimalent paſsions, as joy, Hope &c. The digestion proves while fear, shame &c as have a swalious opperation ~~digestive power~~ or retard it. — Their action is only confined to the musculor fibres of the stomach and useing debility on them, as is proved by the subsequent weekneſs of that organ. — The aliment having undergone their change by Salation and fermentation, in the stomach enters the dusdemen where they are mixed with the Chyle, according to Dr. Ramsay; this distroys the audity and renders it Blind; —

Dr Ramsey has written a very ingenious piece desertation "de bile", Published at Edenburough in which he makes experiments, which proves that assertion. — The bile mixing with it in the duodenum precipatates those parts not convertable to Chyle. And thus from the basis of the focus which are expeled. — The Chyle is obsorbed by a set of Vessels called Lackteal which are spread about the intestines, and which terminate in four or five channels all emptying in the receptoculum Chili. Thoracic duct, thence it passes into the left Subclavian vein. — The Chyle has its constituent parts more intimately blended by passing thro' the Mesenteric Gland.

Lecture 18th

The next subject for consideration as this fluid produced from the Chyle Viz Blood. — I shall confine myself to a Phiſsalogical account of it. — The Red blood as it flows through the veſsels of the living Animal appears to be a hemogenious fluid. — but when taken from the veſsels separate into several parts. First a Halletus rises from its surface, which appears to be more vapor ariseing from the aquious parts of the blood. — The blood diminished after a short time in quantity as the fluid parts thus diſsipated. — Thus it loses a considerable quantity of its weight. — The Halletus arises in quantity as the temperative of the weather as hatter and colder and also with respect to the veſsels the blood is received in, if into a shallow flat veſsel ~~the blood~~ that much of its surface is exposed, the evaporation or haletus will be greater and vice versa. Soon after the escape of this Holletus, the blood separates in two parts. — The one solid or red called Craſsamantum the other transparent or yellow

fluid denomenated Serum. The Crossamentum is a compound substance containing. 1st. Red. Globules as the are generally called. & secondly Coagulable Lymph — The detachment of the coagulable Lumph from the red Globules is what formes the Buffy coat of the blood, observed in fevers, and has long been considered a sign of morbid inflammation or effusion of the Systom. — It was formerly more relied on, than it now is, for many circumstances which are not connected with disease, increase or diminish the quantity of the suff Coat. — The red glabules may be separated from the serum by working in water and leave the coagulable Lymph prove. — The serum is not hemagenious — it consists of a vololile matter which where decipated by heat leaves a coagulaum behind. The blood then consists of three principal parts to wet the red Globules, serum and coagulable Lymph. — The are kept suspended or mixed together, by the heat of the blood. — We shall proceed to give a short history of each. — 1st the red Globules — these supposed to consist of six lesser ones; on which its calor depends from all the schools in Europe — Dr. Hewson has

however proved that the Globules are neither Globulor nor as Lewenkack supposed lenticulor but flat - This this I had once the pleasure of seeing in a very excellent Microscope of Mr Hewson of Europe. Why do not these Globules Separate from the coagulable parts of the blood? instead of the Sereum as they unite so readily with water? for the same reason that alkahal and caustic alkali never unite - some have supposed the red Globules to be of an oily - sem of a watery notum, that they were oily were infered from these inflamability. That they were watery from their mixing with water both opinions are false, if the re watery they would not be inflamable, if they were oily they would not be so readily and perfectly deffuseable through water. - again, The coagulable Lymph is not of an oily nature is more inflamable then the red Globules. - As Mr Hewson pequently showed to his Class in London. The serum two is more inflamable when cogutated. - A second question occurs here - on what does the Calor of the red Globules of the blood depend? Mr Senac answers this by supposing the red Globules to be lenticulor and that two or three of them -

were

were compressed into one, as he observes the more perfectly they were compacted the more intire is the Color But allowing the Globules to be Lenticular which are not supposed to be Mr. Senac opinion is not accurate for the greater degree of concretion should obtain in the vains as the are less agitated then best the color, is most vivid and intense in the arteries. —Some have explained it upon a supposition, it depends on the deprivation of serum This has much influence —Neutral Salts and acids which turn the blood to a black color. — It remained for Chemistry to have the true honour of the discovery of red color to the blood. The hypathesis of the Chemistrity for the most rational that has yet been offered. They obseserve that the air of the atmasphere consists of three different kinds of air. —Phlogisticated Dephlogesticated. Mephitic or Carbonic acid the dephlogisticated is the only pure air in nature, it forms according to modern writers the probulum vitae. —Animals cant live without. This they say imparts the red color, that their opinion is accurate I infer. —1st from the effects

of this gas which is now called Oxegence, on other substances, as mettals. We see for instance, in Red lead and colether Vitriol in pure air these substaces are formed. they are red and abound with pure air. – 2ndly from the effects of substances containing it as nitre producing red color on animal substance, as has also common salt, the more exegene is in the salt the redder the color of the horns,) The Doctr. might have illustrated it better with the effects of nitre on beef.); 3rdly I infer it from the quantity of Oxegene respired being attended with a proportionate red color, as in the cheeks and limbs. – A third question occurs here, that is, what is the use of the red Globules? on this subject, I can only offer probable conjectures. – These are first that they pevent the coagulation by this interposition between the Coagulable Lymph. – 2nd That the assist in the Secretion. – And 3rdly They serve the important purpose of nourishing, as to these must be atributed, the growth and elongation of the arteries. – The next part of the blood is the coagulating Lymph. This is a fluid so called because of its becoming solid and uniting substances or surfaces. – It becomes

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a very strong analagy to the white of an Egg. - Both coagulate by heat, perhaps of 150°. - both coagulate by acids, and both in the same manner. They both too have the properties of nourishing the animal. - They however do differ from each other in the following circumstances. - 1st The white of an Egg, is more bland then the coagulable - Lymph. - 2ndly The white of an Egg, by containing a greater proportion of water is more fluid than the coagulable Lymph, and it never corrects from cold as the latter does. - I must they are the same matter and deſigned for the same purpose. - Viz. the nourishment of the animal. - The spontaineous separation of the coagulable Lymph from the other parts gave rise to many speculation concerning diseases. - Baerhoose supposed it to be a linter or morbid Spiſsitude, and he ever thought it the cause, rather then the effect of disease. - This, and in general Idea of Humoral Pathology are now entirely exploded. - And this Buff coat affords as little aſsistance in the Prognosis or diagnosis of diseases if taken independantly of the pulse. - In some diseases - In some

diseases blood leting appears to produce the buffy coat, as it occurs frequently after the second or third bleeding — in acute fevers. — Many circumstances influence this separation as 1st the orrifice through which the blood flows, if this be large, the more will be separated, than if it bleed — very slowly. In the latter case coagulation takes place before there is time for the separation. — 2nd. The shape of the vessel in which the blood is received influence the separation. — It is most comptetily when in a hollow wide vessel. — 3rd. the materials of which the vessel is made, — most when the blood is received in an earthen cup. — The forth cause was supposed to be heat, but the reverse of this is the case. — coagulables most in cold. — But the contact of air has an influence on it, hence the buff coat is on the surface and not below! (gravity does this I guess) ——

It is the result of moderate inflamotry action of the vessels. — And more violent action there is less coagubable Lymph, and the blood may be cut by a pin thrust through it, it is

conouris that Dr. Clifhorn shoul call this dum blod, tis the very reverse, in still more violent diseases as the plague and yellow fever, the blood is quite fla d, and as it tis termed disalued. - This beaming only hope happens in highly inflamatory diseases in some way of Billious Pleurisy I have observed it. — the Buffy coat then is indicati of moderate inflamatory action. This part of the subject shall repeat its application in practice, When I treat of bloodletting. 1st It has in some cases, I have been informed induced by violent excercise as runing, this part I am not certain of, If this be true, there can be but little disease there. More increase of action without inflamation. — 2nd Sizy blood is observable in persons who labour under preternatural distentions. - As in Pregnant woman they have almost always Sizy blood. —

3rd. The approach of spring often induces Sizy blood. Hence a practice of the Germans to bleed in that season, to reduce a plethoric state of the system, and their blood is sizy, according to Dr. Simpson. - Sizy blood may be induced by letting a ligature round one of the arms for a considerable time

before bleeding. — This was also observed by Dr. Mitchell in the yellow fever Virginia in the year 1743. —

4th. The last part of the blood, which I have to treat is the serum. This consists principally of water and the amoneacal salt together with the animal or Phosphoric acid. — The serum generally contains great proportion of coagulable Lymph. — Which coagulates when the true Serum is evaporated by heat. Hence we hear that the Serum is so coagulable which is not the case Senak calls it the serosity when in this state. — The Holclus is probably the purest part of the serum. This Halclus forms the water in the dropsey of the brain. (Doctor Woodhouse has made experiments on the water of Hydrouphalus Internus, which prove that it is not coagulable like common serum. — What proportion do the third constituents part bare to each other? They vary very much in different constitutions. — It is a matter of trifling consequence, if we could even learn it, which is a very difficult matter to do. — Do any other substances exist in the blood? Some have aſserted that Chyle and Milk, house been famed. disingaged in it. Of this there is no satisfactory

proof, and I think the coagulable Lymph has been mistaken for it. — But I find no difficulty in admiting the probability of it as Chyle enters the circulation, it may be for a time not thoroughly mixed with the blood, but this is transitory. Milk does not exist disengaged in the blood. Senac and Haller were deceived, probably by a Gelatinous matter which I think was coagulable Lymph. Does oil enter as a competent part of the blood, I have my doubts of it, the facts and arguments related by Haller in proof of this assertion are so few and so illy attested, that I think he was deceived. Is there air in the blood. I answer I believe there his, is it in a elastic state? I believe it to be in a Semi elastic state, as we see it in water under the exhausted receiver of an air pump. — Dr. Monro made experiments to prove, this he tried two Legatures round the Caroted artery of a Dog, so as to include a portion filled with blood, found it under water and pricked it with a pin and a quantity of air bubbles were disengaged, a second fact in support of this opinion is that blood sudenly frozen has cavaties in it which if pricked with a pin under water, yield air. —

Polypi arises from a disposition of coagulable Lymph on the obraded coat of an artery which continues to increase by continued deposition of Lymph which if it exists in any of the large arteries produces death. A very material question, occurs is the blood alive? Does it possess irritibility or contractility or a capacity of performing vital actions? This opinion is very ancient, "that the blood of an animal is its life". Moses assisted it. The opinion has lately been received by Mr. John Hunter a Man whoes contributem to medical knowledge has been such as render most of his opinions deserving respect. + And all of his assistance worthy of consideration. + I wish I could adapt his Idea of the Vitality of the blood, it would assist me in explaining animal life as it would afford a very extensive surface, for the action of Stimuli. — But I cannot do it. Mr. Hunters arguments in favour of the Hypothises are 1st. - That the blood unites living parts of the body, as the Sap does in a Tree. Had Mr. Hunter ~~[illegible]~~ been acquianted with a fact. which any Gardner could have told him of in

in grafting he could not have fallen into this error, it is that branches do not unite, unless they be in close contact. 2nd the union of certain parts in consequence of inflammation, under certain circumstances. — This is merely done by an elongation of the blood vessels, and not the blood. —

3rdly The Blood in the ~~Stomach~~ stump of a limb after amputation is vascular, as Mr H. proved by injecting. — This I explain as readily by the elongation of the arteries through the coagulum. —

4thly In bleeding from the arm in a cold temperature. The same heat of the other living animal matter. — This argument need hardly to be refuted it requires its resemblance from the living animal Solids. — For it loses this temperature by being exposed to the air of the Atmosphere. Where heat is required. — 5th Blood is acted on by stimuli and shews signs of this action in coagulations." Here I answer that cold which is undoubtedly no stimulus, is the cause of the coagulation, and that it is owing purely to the abstractions of heat. — 6th — Animals are hearty and said to be alive in proportion to the blood they have

This I deny, Inflamatory Fever comes on when the system has a great degree of blood which should not be the case according to this opinion.— The different times in which blood coagulates in inflamatory fever sufficiently points out its Passive nature, the action of the Vessels produce all the effects he ascribes to it" 7". Blood preserves life in different parts of the body" This is true and in producing this effect, it acts two ways. First by conveying nourishment and secondly by its Stimuli.— It acts as aliment precisely by yielding stimulus and Nourishment. &c

nd yet you will hardly suppose that a loaf of bread, which does this is alive! No more is —The dissolution of blood may be supposed an argument in faviour of this opinion.— But it is as readily explicable by the actions of the Vessels as by the Vitality of the blood.— Blood is then the renate cause of life, and also the ~~whole~~ Vehicle of animal heat.— Mars did not err in calling it the life of the animal.— It is the spring of Life, and the expression is not more improper than some now in use, not only among medical

men but writers. Palate. Literatiose, who call wheat the staff of life. And pure air the Pabulum Vital.— Mars probably said it Figurratively.— I lament the bstamate hardness of Mr. John Hunter.— It prevented very much his advacement of science.— But he had adapted a resalution which he communicated to Dr. Shippen never to give up any of his sentiments or opinions in Medacine, till he gave up the Ghost.— We neat pass to a consideration of the Lympatics or

Obsorbent System.

Here you will not expect a minute detail of the Various opinions of Physcala gists of their controvesies respecting the system of vessels, such an enquin would be useless, and to you fatigueing. I shall merely advance a few facts, such as are necessary to explain the principals of Pathology and be usoful to us in the practice of Physic.— In the obsorbent system is included the Laclials and Lymphatics, they are the same kind of vessels, differ only in the fluids, which they convey.— The one Lymph, the other Chyle, both open into cavaties, both pass through Glands

and both have values. — They enter into the Thoracic duct and receptaculum Chyli, whence thier contents conveyed into the left Subclavian as I observed when speaking of the Chyle. — The may be discribed as a systom of small vessels arising from the surface of the body, and from the cavities. — Whose office is to receive certain matters, and convey them to the blood. — The pass through conglobate Glands in their corse. — In the Lymphatics the following circumstances deserve our attention. — —

1st. — They possess like the blood Vessels Musculor fibres and consequently contrac tile ~~however~~ power. Which assists in propelling their contents this is proven by their Dilation or contraction when irritated, their sensibility is proven by the pain and swilling which occurs in them —

2ndly — The are furnished with valves which hinder the reflux of their contents, in the same manner of the vains.

3rdly — They are plentifully supplied with nerves and blood vessels and possesses the circulation as ther vasa Vasorum of the blood vessels. —

4thly — They have mouths or openings analagous

to the mouths of animals for the purpose of receiving the substance they are to absorb. — As fluids, flesh, bones, &c. This has been infered, not only from their abitity not only of receiving any fluid into them, but of feeding as it were, on solid substance as bones &c. — The have too been demonstrated in certain Fish. — 5th The Lymphatic Glands appear to be a convalution of vessels. — Tho Dr Monro thought them Cellalur. — Mr Hewson has proved them to be vessels connected by cellular membrane. — Having treated of the circulation of blood of the Chyl, and of the Lymphotic vessels, and traced the course of the Chyle to the heart, it remains next to consider the formation of Lymph. This I shall next consider the next Lecture.

Lecture 19th

Lymph.

Mr. Hewson first supposed it to be a secreted liquor.- It is coagulable and bares a great analagy to the coagulable Lymph of the blood, which I think it forms after entering the circulation.- Its coagulability is proved by inflammations of the Pleura, and in the cavities of the obdomen and Thorox resembling the buffy coat of the blood. Mr. Hewson supposed the secretion of pus to be performed these same veſsels which secrete the Lymph. - That pus is formed by inflammation of these veſsels.- This doctrine which was broached by my predeceſsor in this Chair. Dr. Morgan has met with general reception.- In what manner do the Lymphatics veſsels take up these fluids? - This was formerly explained on the supposition of capillory atraction.- But I rather atribute it to the action of the veſsels themselves which seize on fluids or substances presented to their mouths. How is the Lymph forwarded to the Thoracic duct? I answer first by the pulsation of contiguous

Arteries. 2ndly By the Pressure of contiguous muscles. & thirdly by the specific stimulus of the Lymph, exciting action in the vessels themselves. — The valves serve to prevent respissitation. Are these Lymphatic vessels in every part of the body.? — I answer – I believe there are with the exception of the head. – Several facts make it presumable they exist here. 1st It is probable from analogy. In the state of Fish. Dr Munro has observed them and we suppose from analogy, that the human subject, also has them. — 2ndly I infer it from the Phenomina of Diseases observed by Mr Hewson. Viz. A Palsey of one side of the head, cured by the swelling of a Gland on the hip. – This he supposed induced absorbtion, and so cured the Palsey ——

3rdly I infer from cures which have been made of Hydrocephalus after water has been effused. —

4thly These facts are to be explained only by Lymphatics, Veins are found not to absorb. – I have said the absorbent passes the power of absorbing, not only fluids, but also solid animal matter. – The disappearence of the Tymus Gland from the Thorax. – The disappearence of small fragments of fractured bones. –

the levety and loſs of substance in the bones of old people. — The softneſs of the bones in some diseases, the appearence of bony matter in the urine, are all facts, only explicable on this principall. Again the disappearence of tumors and wens without excision affords us another proof of the Fact. — Mr. Hunter found the articulation of the thigh bone in young people ------------------------------

Hence it would appear that the arteries and Lymphatic System carry on a contest between themselves. — Their offices are precisely contrary, the are to take away parts of the body; and the other, (the arteries to supply fresh matter in its place. in this contest health consists. — When they conclude an armistice, death is perhaps the consequence, or at least Deabetes. Dropsey, Hydrocephalus &c. may justly atributed to this source. But these are not all the offices of the Lymphatics, they absorb moisture from the air of the atmosphere. This is proven by the encrease of ~~veſsels~~ weight of a person during rainy Weather. — 2nd. By the number of these veſsels, which open on the surface of the body. — 3rd. From the fact that thirst

has been removed in shipwrecked persons by being wet with Sea Water. — 4th. From certain substances as Garlic and turpentine, when applied to the skin, being detected in the Secretions, to wit in some cases in the saliva but almost — universally in the urine. — attempts have been made first by Dr. Segeir of France, and repeated by Dr. Ropea a Gentleman who Graduated in this university last spring, to overthrow this Doctrine. The endeavour to prove that absorption his carried on wholly by the Lungs. That the substance applied to the skin, becomes vaporized and respired, and then absorbed by the lungs (See. Dr. Ropeus inaugural Thesis publish 1800.) The experiments alluded to. I do not think conclusive. — The action of the Lymphatics is excited first by the stimulus of distention. — This we see in the Gallbladder. The yellow color of the skin, in many diseases, being oweing to this cause. — 2ndly. Again Distention of the stomach, as with Cyder in dropsies affords an argument in favour of it, as absorption is excited by this means. 2ndly. Their action is excited by pressure. Dr. Munro mentions a case where the

whole Sternum was absorbed by presser of an Anuerism or Palupus in the bow of the Aorta. Dr. Hunter likewise relates an instance of a portion of an Anuerism being obsorbed, by the Pressure of a tumor on the scalp. In this manner the Pea used in Issues, acts by promoting obsorption frome its Pressure. Large ulcers are formed on the buttocks of people, who have lain in Bed a long time, and this stimules of Pressure is the cause. — 3rd. Friction promotes absorption. — This fact is well Known, and made use of in amsarrial dropsies; In these the frictions should be upward in the morning. — 4th. Vomits promote it. In a letter from Mr. Cruickshanks, to Mr. Adre a case is related, in which vomiting caused a remarkable diminution of the size of Knee joint which was dropsical. Produced accidentally. — Took my salt of tartar, for Saluble tartar. Mr. — Hunter relates a case of bubo cured by vomiting induced by being a Ship in the Channel which had advance to supperation, and he intended to have opened it the next day. — 5th. Purging promotes obsorption. — Thus we weigh heavier after the opperation of a Purge, by the absorption of Water

from the atmosphere. — Mr Hunter accounts for the conversion of a Gonorhoe to Lues, which occurs after to the injudicious prosiription of purges producing bsorption of the matter. — Electricity obstinance from food — debilitating possesions of the mind and a number of other causes. — For an amount of which I refer to my observations on dropses published in my 2nd Vol. Med — ing and observ. ——

The cases of the obsorbent system are great and many. The live for the growth and renovation of the body. 2ndly The may be considered in the body as Scavengers, or rather as the swine in the streets of a City. Which feed on the offalls as it were and frequently absorb morbid matter. —

3rdly They preserve the fluidity of the blood by absorbing moisture from the atmospheric, air when here is a scarcity of it, from accident, and thus prevent the acrimony of the fluids. — Lymph is frequently found in the caveties of the body. In cases it is secreted and poured out from the ends of the arteries. It serves in these cases to unite parts and the serum, and the red Globules are not affected with it, as would be the case, if it were

not a secretion.— The conglobulate Glands of the Lymphaties, performs this peice Service.— When we contemplate then the important use of the Lymphatics System. We are struck with astonishment that this discovery was not effected till the year 1652. let us learn from this fact, not to place too much confidence in our selves but to be modest and unpresuming to posterity, and not to vallue our ancessors too highly.— Perhaps Posterity may make discoveries of yet much greater importance, than the Lymphaties. themselves.—

We next pass to consider Secretion.— here Gentlemen I feel disposed to make a pause for I am sensible that after having frequently— thought and studied the subject, I know but little more of it, then I did the day I commenced the study of medacine. But yet I will proceed perhaps, in the course of my observations, I may through out a hint which may serve as a clue to lead some of you into a more successfull investigation of the

subject. — I shall begin with a general account of the mature of selution, and some opinions how it is performed. — 2dly I shall examine each of the secreted Liqurous seperately and lastly, I shall consider each of the excretions. ——

1st Here I shall venture an opinion. I consider Liver the liver as an excretory duct and not is taken for granted in common as a gland. Fat too I exclude from the secretions and consider it as a disease. — The structure of the glands I take for granted is vascular as the injection of Ruysh have put the matter beyond all doubt. ——

The secreted fluids are different from each other. Some are perfectly fluid and watery as the urine; some are blend and of a thicker consistance as the mucus, others are still thicker and colored ear wax. Some are colored and fluid as the milk &c. &c. are differing from each other matirially, all these various Liquors are secreted from the blood the question we are now to consider, is, How, and in what manner is this performed. — The opinion on this subject are various, some have explained secretion from the different Size and Figure

of the vessels of the Glands. — Capable thus of admitting certain parts of the blood and rejecting others. This Hypothesis presupposes the existance of all the secreted ~~parts~~ liquors in the blood, which the advocates for it have never been able to demonstrate. — A second Hypothesis, is that a species of Fomentation goes on in the glands. — Seguin, is of this opinion, one of the arguments in its faviour, is that secretion is increased by error Loci. — The adduce analogies from several facts which favour this opinion — it is remarkable that various matter, and several others appear to increase themselves by some such process as Fermentation. This matter only acts is increased in one perticular part of the body Viz. The skin. — Variolus matter swallowed and taken into the alimentory a canal, produces no effects peculiar to it. — The force it excites, only ensues from its action on the skin for it may even be injected to the blood, and no ill effects result from it. — The also ask. — Do not the passions and Emotions of the mind, and the increased action of the nerves and arteries, which are found to have a great effect

or the secretions act by creating mattan which increase Fermentation? Mr. Leibnitz - to account for it, has supposed, that there are but five original forms of matter in existance, and that all the differentte Propperties and appearences bodies are oweing to different madifications. — This opinion appears improbable when we reflect on the amazing member of forms which badies put on as tought as by chemistre the very ins which appear all simelor, to be characterizied by distinct Propperties. — And the late new discoveries concerning water, that it consists of two kinds of ir in humid form. — It is remarkable that the more appears, the ~~more~~ secretions are the more, they become unlike the blood of which they were formed, for instance, the Lemon. — While those which are not so apperiously conducted resemble it more as Mucus Milk, Urine &c. Does not this afford an argument in favour of fermentation. as we see the same takes place in that process out of the body. Thus old wine differs most from the original Juice of the Grape. — Where as Beer and malt Liquor taste sensibley of all the parts of which

which it is conspared. ——————

This Gentleman, I have just lifted up the curtain, I have no doubt but in time the whole series will be unfolded. – I shall conclude this part of the subject, by observing, that the Glands may be compared to the Clasits of a convenient house containing different Kinds of Aliment for the convenience of the Tennants. ——

2nd We next proceed to the Secreted Juices. – They are Lymph. Saliva Gastric Juices Pancreatic Juices Mucus Synovia Urine Semen. – Liquors of the Prostrate Gland Milk. – I had formerly some hesitation in admitting the Urine among the secretions, but the Stricture and Functions of the Kidneys have done away my objections. –

First of Lymph.

Lymph. This I have treated of under the head of Lymphatics. – I attributed the coagulability of the Serum of the blood to the Lymph it contains, and observed that, that found in Hydrocephalus internis is not coagulable – nothing now occurs on Lymph, I pass to.

Saliva.

This two I hinted at when on digestion. It contains much Amoneacal Salt.— I observed that it acted as a ferment in our aliment— the quantity of it secreted in a day is a bout twelve ounces. —

Gastric Juice.

Contains a quantity of the same Salt as saliva. When treating of digestion I shake off its wonderful solvant powers.— This I observed differs at different periods of life. Being stranger in old people than adults.— This I said was a wise provicion of nature, to obviate the ill effects of imperfect indigestion mostication.

Pancreatic Juice.

The nature of this fuid bears so strãg afinity to the saliva, and is the same nature as the saliva.— A question has accured respecting its action may it not be to unite with, and blunt the acidity of the Bile.—

Mucus, Is situated in a great many parts of the body, its use is to obviate the effect

of Frictures from external, as well as internal causes and also to prevent the action of Irritating fluids or substances. Hence we find it situated in the Esophagus. non Trachea. – Stomach Intestines. Urethra and Vagina, in some of these parts a covering of it is absolutely necessary. – If for instance, a part of the Trachea became bare of mucles the very air produces an irritation that excites coughing. –

Synovia.

The synovial liquor is secreted exclusivily during the night, this is proven by the difference of our size in the morning and evening. Half an Inch difference is observable. – Soldeirs are acquainted with the fact, hence before they admit Men to their different companies, they measure them at Night. – Its use is to prevent the Friction of the bones. –

Urine.

This concerns much Amoneacal Salt a peculior Tasted oil in small proportion, and a portion of Acid which is of the Animal or

Phosporic kind also colcarious Earth and a large proportion of aired Serum.— A number of circumstances influence the Junction of Urine.—Heat diminishes, and cold increases the Secretion Urine They have been explained from the greater perspiration in hot weather, than in cold.—Fluids taken into the stomach cause so quick an evacuation by the Urine, that it has been supposed there was a more desert paſsage from the stomach to the bladder, then by the kidneys, some explain it by speristaltic motion.—The College of Physicians, have on record a case communicated in a letter from Dr Santis of a discharge of Urine and Urinery coluclus from stomach.— This case appears to favour the opinion, but may it not be explained by supposing a translation of the secretion to the stomach? As of the senses, which we before said suffer a translation in som cases of Vomiting of Urine, are recorded else were, and the fact is I believe undoubtedly. Certain paſsions, and effustions of the mind have an influence on secretion.—Fear increases

it very rapidly. — Study has a similar effect. — Hence Studious people use frequently at Night to void their urine.

Semen. This has a disagreeable smell and — Mr Hunters Idea that the fluid Secreted by the Testicles is not the same as that formed in the Vesiculae Sammalis is entirely Hypothetical. — This Secretion is commenced at Perberty and its being absorbed into the system, has been supposed to be an explanation of the change induced in the system at that age. — but this is rather an effect of that Change. — For — Change takes place in the female sex at that age, and the have no semen to absorb. — In obstance from venery it becomes thick, by absorption of the Thiner parts of it. — But in excess of Venery, or in that foul vice Onanism makes it very thin and watery. Blood has been known to be ejected in the latter case. In old men, its romidity his probably increased, it now and then gives them pain in its expulsion. —

Liquor of the Prostrate Gland–

This fluid is of the nature of Mucus. No important case has ayet been assined to it– from what has been said of the Semen.– May it not be to cover or blunts its acrimony, and prevent its injuring the Urethra? and also afterwards in the Vagina.

Milk. The Liquor is the simplest of the Secreted fluids and of course the most like the blood– The Milk has been used as in example of secreted fluids, exising formerly or disengaged in the blood vessels. But I doubt the fact of its having been formed there. I think the coagulating Lymph has been mistaken for it.– Some say it is secreted from the fresh Chyle before it is mixed with the blood, and this I am disposed to believe. Milk however is not pure Chyle, It undergoes the process of Sanction, and is to the Chyle what coagulating Lymph is to pure Lymph, before it enters the circulation.– The quantity secreted in the course of ~~th~~a

day, is perhaps more than the quantity of blood in the body, to let sixty pounds in a case in twenty four hours. Another fact which renders it probable that Milk is Chyle. Some what altered is mentioned by Dr. Percival. — he found the Chyle which proved fresh from the animal, he found it become acid and undergo nearly the change as Milk. Volatile alkali blood. . . . .

The Milk consists three different parts to wet oil Mucilage and Serum or water it may be considered as an animal

The ~~animal~~ oil may be considered as its vegetable part, The serum of the milk is usally called whey. — it contains as large quantity of Sugar according to Dr. Young four ounces of the whey contains 64 grains of pure sackorine matter. Hence we understand why milk is so nourishing — it contains all the three nourishing principals, oil, Mucilage and Sugar Hences it produces disease from plethora

in some weakly people.– The secretion of the Milk are influenced by the passions of the mind. Instances are recorded of Children geting convulsions from their Mothers passions.– It is strange that the milk is not the vehecles of diseases, Instances are recorded of Children sucking nurses afforded with Lues Venera without contracting that denon.- And Dr Cox relates in the Philosophical Transactions that he sucked his Mother when sick with the plague, as she informed him without his taking the disease. When disease is contracted in that way. I beleive it is by the breath. We pass next to the consideration of the Excretions. These are Feces, Bile, and Perspiration. Some reckon sweat to be a peculiar excretion, but I beleive it to be only the perspirable matter excreted in greater quantities and condenced. Feces Alexander the Great is said to have observed after he had conquored the world, that if it were not for his passions for the woman he would think himself a God. Had he said that of the daily discharge of his faces, which he was forced to do, as well as the mea=

=nest

meanest of his slaves, he could have spoken of a much more universal Characterestic of Mortality. The Faces are precipitated from the aliment by the bile. The occupy the intestines and petrify in them. By their acrimony and weight the stimulate. - The rectum and audas changed in health daily, tho' this is not invariable, Some are of more costive habits then others. - by distilation they yield a Volatile Oil and are acid.

Bile. I formerly supposed the bile to be a secretion, but from having read an excellent treatise on they bile by Dr. McClury, I am used to believe ~~to be~~ it an excretion from the septic tendency of the bile, from the process of its formation being performed by a vein, whereas other Glands have osterues to supply them with blood. I have infered it also for many other reasons, as it increased raidly in bilous fevers. - and from the Passions of the mind increasing the flow of bile which it does by increasing circulating,. Exercise of the body, causes it to be increased. Hence the better taste in the mouth after violent exercise, its bitterny

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bitterny affords another argument infavour of its being by a Sceptic proceſs. as in a rotten apple.— Its excretion is increased during hot weather it poſseſses on the whole more of the properties of an excreted then of a Secreted fluid, — it being discharged in the Cuttle fish near the anus as Dr. Monro has observed is another argument in favour of its being an excretion. Its acridity is blunted as before observed by the pancreatic Juice, Bile is evidently antiseptic to other substances, tho the product of putrifaction, it prevents this proceſs in meat — How this happens is curious, but simular facts obtain in natural and useful as the ~~natural~~ & moral world Nitre, the result of Putrifaction prevents that proceſs in Animal substance.— Again the green substances which we find the product of putrifaction, in stagnated water forms a pelicle over ponds which not only prevents the riseing of the noxious affluvia but purifies the air by respiring dephlogesticated air.— A showe of rain or any other cause which breaks the pelicle produces disease in the

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ighborhood by allowing the escape of this effluence. - In the moral world we have unnumerable instances of evil, however simple this Theory may appear, it is no less admirable. In contemplating the liver I have been induced to compose it to a manufactory of Salamonic. Whence all the animals effects are collected and made into a nice medical Salt. In this process however, nature far exceeds art carriing it on without smell. - The normal color of bile is a yellow, tho' from some instances cause ~~f~~ it is frequently green, and in Malignant Fevers its color turns brown and even black. This color I think it requires in the alimentory canal. - The blood is observed to vary in the same manner, in certain diseases and I suppose from an enterance of the bile into the circulation. I have seen blood probable from this cause quite black as if sot had been mixed with it peristaltic motion of the bowels as excellerated by the Stimulus of bile - Emotions and passions of the mind I observed increase, the exorition of the bile. - I once knew a young ~~man~~ Gentleman,

Gentleman who received an insult at a friends house which he could not decently resist, his anger was allmost uncontrolable, he retired to an alley in the neiborhood and relieved his feelings by discharging by vomit a large quantity of bile from his stomach.– This emotion of anger has been always known to produce this effect, hence passionate people subject to anger termed choloric. Hence in disembling on angered men says. Bile tumit Jeror. The bile by anolysis, yeilds oil, water and Phlegm and an alkaline Salt. They do not exist combind in form of a soup, this Idea is entirely Hypothetical.– The quantity of it in many diseases is very great, hence the term bilous fever. &c. –

Persperation.

It may be asked here, have you proved such an excretion to exist – I answer by a very simple experiment, by wipeing the arm perfectly dry and putting it into a Celindrical Glass vessel vapor will be condensed on the side of the vessel, which is the perspirable matter or by

holding a peice of Glaſs over the skin, when it will be collected on it, or condensed on it). It has been, it may be ~~said~~ seen by very fine Glaſses iſsuing two or three inches from the arm. - If the perspired matter secreted or discharged from the extremities of the arteries? I answer I believe it to be effused from the extremities of the arteries.

Malphighi and Boerhoove were of this opinion - The latter by a very Succeſsful injection of a fine fluid, is said to have perceived the injection, which he forced into the arteries, exuding through the pores of the skin. - What is the nature of the perspired Fluid? It contains 1st Phlegm and water, 2nd Salt, this is evident from the saline taste of the hand when sweaty, and also from the taste of Clothes, which have been worn a long time without being washed. - 3rd fixed or Miphitic Air, that it contains this gas, we infer not only from analogy with the lungs, but by actual experiment. If a candle be placed under the Bed, Clothes of a person, who has slept all night under them, it is extinguished. - A certain Odour

is always present in the perspiration especially of hands of working people, in whom it is moss Fasted thus it has been proven from experiment, that the air of a given space, is more adulterated, by two Carpenters at work, than six watch makers at work. - The same length of time, dogs are able to distinguish their Masters merely by this circumstance of perspiration. A dog will tell his master, and trace his footsteps, among a thousand ~~more~~ others, merely from the peculior odor of his perspiration. —

I mentioned when heating of the senses that Le cat mentions a case in which a person was able by the perspiration to distinguish a Virgin from a married woman. - I also adduced the instance of Brokmans, who are able to distinguish persons who eat meat from such as live on vegetable diet merely frome the smell of their perspiration which is influenced powerfully by this circumstance of diet. - Disease has an influence on the smell of the perspired matter. Hence the yellow fever is distinguished from other fevers by some. - According to Mr. Lang of Greenland

Greenland. a boys perspiration was so much affected by swallowing spirits Turpentine that he smelled of it five weeks afterward distintly so that medicine may be considered as one of the causes which influence the smell of perspiration. This fact Gentlemen is of use in shewing you how long the seeds of disease may in some cases remain in the system, without being called up or excited into action. ——

Dr. Jackson, says that they remain Latent a long time in certain cases, and I believe it as in Hydrophebia. — after the valatile parts of fluids of perspiration have been separated by heat a Gelotinous matter remains behind, which has been supposed by some to be Secrited by Sebaceous Glands, but this cannot be proven, and I think that Baerkaones, experiments prove that it is pointed at by the arteries. ——

Is Sweat Secreted by vessels, different from those which pour out the matter of perspiration. I answer sweat differs only in quantity from the former, it is poured out by the arteries in a relaxed and dilated State, which is

caused by heat, and other causes, - What quantity of it is excreted? I answer ~~by~~ more than by the Urine, Stool: and all the other excretions and Secretion in a given time. - Its quantity differs as to age in a healthy adult it is perhaps thirty three ounces in twenty four hours. 2nd It differs as to season in summer perhaps six times as much as in winter. Viz. 3lbs in Summer and half a pound in winter - in moderate weather it averages about thirty three ounces in 24 hours - 3rd debility, hence the difference in quantity during the sleeping and wakeing - state, it is much copious in Sleep. - Calculations of the quantity have been made, whence it appears, that as much is excreted in five hours sleeping, as in seven while a wake. - That from supper, till six hours after having eat supper six times as much is excreted, as between and the five hours, so that the longer after supper till the seven seventh hour, the more is excreted Emotions of the mind have an influence on it Ideas various much the quantity of this discharge - Drinks motion - Paſsions of the mind

the gratification of the venereal appitite influence it. - Hence they are under the impression of stimulas. A great degree of harmony exists between the Kidneys and the excretion of Sweat. Cold deminishes the former, and decreases in the same proportion. The discharge of urine. - When it is retained, debility is the cause and fever is produced by the fulness and tention then creating. But more of this when we arive at Patharlogy. The next subject ~~under consideration~~ in order is Nutrition, This I shall consider tomorrow. -

Lecture 20th. -

On the subject of Nutrition - two opinions have prevented - One that the body is nourished by the nerves, and that other that the arteries perform this service to the system. - I adapted and

and formerly taught, the first of these theories which I learned of my master Cullen, but I have since been convinced, that the argument from which I had formed my opinion was faulse, and I have of course adapted the latter theory;= The fact I allude to was that the brain was evolved before the heart and arteries. — But this opinion is refuted by Dr. Monro who believes that the arteries nourish the body, Has proven that the brain is not evolved prior to the heart. Dr. Haller has proven that the heart and arteries, are formed prior to the brain, and nerves in the Chick in Ovo. — In 38 hours after in incubation. — In forty five hours the Ventricles of the heart and auricles were formed, the heart not till the 41st hour, the Eyes not till the 81° — in the 120 hour, the brain was watery in 168 like mucus, in 131 hours ......
These facts prove the precedence of the heart and vessels to the brain & nerves. — Monro — —

— — — — — — — — The first impulse appears to be of the blood upon the heart and vessels. These are excelent conduction of Stimuli, and act secondly on the brain and nerves, These 3d heart

react and by their stimulas excite the heart and vessels. After which they appear to act reciprocally on each other and life results from this reciprocal action. The first Stimuli is the blood. then the ~~heart~~ arteries heart &c. —

I agree with Dr. Valli in supposing the brain to be the extremity of the nerves, and the other ends the origin of them. They originate from different parts of the body, and terminate in the brain; The reasons who exclusively of the above facts, induce me to conclude that arteries afford the nourishment of the body are 1st. from great disproportion of the brain to the body, which would not obtain if the brain nourished the body. Thus the Brain of an ox is but one forth as large as that of a Man and yet an ox is six times as larges than a man. ——

2nd. According to Dr. Munro, Monsters who are born without Brains are nourished as well as those who have them perfect. — Now this could not be the case if the nourishment was derived from the Brain. — 3rd. Parts which have very small nerves, as well nourished as such as have a

greater quantity distributed to them. - 4th - Dr Munro distroyed the Sciatic nerve of a Frog. - the Frog lived for several years after it, and his leg was as well nourished as the other one, and wounds made into it healed as before. - 5th - another proof that the blood vessels do perform this office of nourishingent parts is that Madder by entering the circulation and passing through the vessels into the substance of the bone color it red. - Madder could not be conveyed by the nerves. - - 6th - The kinds of matter are so variously supplyed by the blood. - The nerves contain always a simelar flaid, at least it is probable. - 7th - The secretion performed by the arteries - : -

- From this view we see the importance of the blood vessels. It has been the misfortune of Medacine that this importance has been over looked in most of the systoms of medacine. Boerhaave atributed the change of the body, by disease to altiration in the properties of the blood and overlooked the vessels altogether. - Cullen on the

other hand ascribes the phenomena of disease to the nerves. — In this he was followed by Dr. Brown. The nerves from the basis of both these systems of medicine. — If I have contributed by my studies and labor to the advancement of the Science of medicine, it will be my having made the sanguifferous System the object of my attention, whilst at the same time, I hope I have not entirely overlooked those of my predecessors just mentioned

Chapter. III.

Hitherto we have considered the functions common to both the sexes. We come next to these which are peculiar to each, or to the peculiarities, which distinguish the sexes, They are such as depend on the body, and such as depend on the mind. 1st — The peculiarities of the Female body. First. The peculiarities of the Female body. The general and local, the general are first. — Woman in all ages of the world, and in all countries, have been and are less than men. — They arrive at their full growth.

Growth sooner than Men. 2ndly They texture of their simple solids is loxer than those of men, their bodies are less firm and compact. — Dr Munro was able from this cause and the furrows made by the pressure of the arteries on the bones being stronger in woman than in Men which in consequence of this he was able to distinguish · between a Man and Woman Skeliton. — 3rdly The arteries of woman possess more contractability than those of men men, owing to the laxity of their constitutions. — It is remarkable also that the discending ~~arteries~~ Aorto is weaker in women than in men. — 4thly The nerves in woman are more sensible than in Men. — Hence they ceive Stronger impressions, both of body and mind than men, their nervious Sistom being more excitable. — 5thly The Brain in woman is more liable to inotion than in men —

The localpeculiaritie are 1st The Pelvis is wider in woman than in Men. — Hence they are able to retain their urine muchlonger than Man — 2ndly They have a hollow venus in the Pelvis, which men have not the Uteries-

with its vessels and apendages for the a commodations of the Foetus. — Thin external organs of generation, differ from those of men. 4th — They have a periodical discharge of blood, from the Uterus and Vagina — 5th — They have two Glands situated one on each breast, for the secretion of Milk for nourishment of Children. — 6thly Thorax moves more during respiration in woman than in men, to make room for the uterus in Gestation; and hence we see the respiration much more plainly in Girls, than in Boys lastly. The voice of females is much more soft and shrill, than that of men. — Thus far we have considered, the obvious peculi~~aait~~ties of the body, but we must carry over enquiring further, for I include the mind in my course of Physiology. — I am aware that the generality of Philosophers suppose the peculiarities of the Female mind to depend on education entirely, with this opinion, I do not coincide. — There is so much original difference Stamped by the hand of the Creator between the minds of the sexes as in the

body. – Their differences appear first in the understanding. This in woman is less vigorous and comprehensive than in men, and is less incomprehensible." – — ——

2ndly In Immagination, Women are inferior to men – in fancy they perhaps excited man but immagination, they do not possess in so much perfection, hence we find the Poetry of women is very good but is never sublime. – Who ever knew a woman with an Iron Immagination. Such a one as Burke possessed. – 3rdly The memory in women is greater for words and events than in men – but for Ideas they are inferior – They recollect words and events most perfectly which are associated with pain, as that of Child Bed. – On this account of memory for events, they have been Stiled living Almanack – The Indians commit all their transactions to the woman – And in cases of treaties or the like where correct information respecting events, is requisite, they are always called upon. – 4thly – women are Superior to men in that Faculty of the mind which when denominated

I ask, hence their Ideas of propriety are quicker and more accurate then those of men. It depends in them wholly by immitation, in this they exceed men. —From the circumstances of the superior taste of women. Young men derive much of the palish of which they are poſseſsed, by being in company with women

5th The moral faculty is more perfect in women than in men. Hence we see them poſseſs Sensibility and acuteneſs, in this respect than men. Women have the same sence of the deity in greater perfection— than men. This may be owing to their sedentory lives and being more alone than men and leſs exposed to the circumstances of life which may have a tendency to obscure or deminish it of course. Women are generally more vigorous and devote then men.— A fact occurs to me now Gentlemen which I should have mentioned, when speaking of memory, It is that the wife of Dr Cullen poſseſsed it in her lattor years, to such an amazeing degree that she could tell the

the imployment, pleasures, manner of her spending her time, or any trifling event that accured during the last six or seven years of her life. – If for instance, you should ask her, how did you stand the evening of the 5th of July 1792? She could immediatly answer and discribe the company. She was in, any other ~~way~~ circumstance that happened. – To return, women possess more chastity than men, and humanity, but less actual benevolence. – Hence we find very few femeales Citizens of the world Sauety. – Country and the like important things, they take no interest in. – Women have less concearne than Men This I explain from it not acting in as much force in these as in Men. – They are less exposed to cases in which the condence it concerned than men are of course, it does not act in them with so much vigor as in men. – Mr Hume expeains this by supposing the earley dissimulation which they learn from the mod of life, aind instruction to be the cause of it, but this I do not beleive. – They are of course less dis~~tis~~tinguished by their varacity than Men. –

The opperation of the female mind differs as much from the male as its faculties. – The have quiker Perception than men but thier Judgment and reasoning powers are by no means so great. – Women have more fortitude than Men, but less courage. – The former consists of being passive, the other in an active Virtue of the mind. – Women are more inclined to Society then men, they are more communicative of Secrets then Men but they are the Secrets of others, not their own. Men on the other hand are communicative of their own Secrets and tenacious of the Secrets of other people. – Women are less forgetful of the resentment, and less forgiving of Injuries than Men, this the effect of weakness in them Great minds have no occation for revenge. Women are less influenced by the venerial diseases then the men, and more dilicacy and modesty then the latter. – Are these differences the result of Education? or the innate and instinction? I incline to the latter opinion. Mrs Woleston craft the auther of the Rights of woman. Supposes the only difference between the mental

powers of women and men, to be owing to Education this celebrated writer and helvetius are both wrong the opinion is hopothiticus, it is observed, there is certain an original difference Stamped by the hand of the creater in the Womb, we see in the earliest Infancy, who ever saw a Boy delighting in playing with a doll, or a Girl, anticipate riding on horsback by riding a cross a cane? Observations made to any - — - - - - - - — - — between the mental powers of the two sexes. . I answer masculine women and effeminate men. — but they can only be considered as an exemption to the general Rule. —— — — — —

Let not the Youthful Champion of female excelency suppose the above observations made from a decoy of respect for the sex. — Far from it Gent— No man living has more reason to admire and respect and love the sex more than I have. — But that there does exist, a contrast, mental as well as corporal, I am convinced, and it is right there should be. — My opinion on the subject, is as consonant with reason, as it is with devine Revelation. I shall not make

my apology for having treated of the subject as fully as I have done.— It ought to conclude in a course of Physeology.— No man who is unacquainted with the above facts is capable of prescribing for a disease.— From the structure of the female constitution, arises that monthly discharge of blood from the Uterus denomenated the menses or Catamenia. 1st This discharge of Blood which occurs periodically is confined to human species. The female monkey perhaps excepted. 2nd It occurs at different Age, in different countrys.— In the middle of the United States, it occurs about the fourteenth year. 3d in people in high life, sooner than in such as are exposed to hard labor.— and sooner in women who are much out of doors, than in the sedentry.— There are many exceptions to the time of its commencement.— I knew three Children in this City in whom it occured under the seventh year these never occur at monthly periods, these two were of one Family. Dr Haller mentions some instances in which it occured in the 1st 2nd & 3rd months of Age, these occurances are rare.—

at the time of this appearence, the breasts begin to swell, The Eyes become more bilint the voice more melodious and the whole system and deportment under goes an a greable change, The venerial appitite is now felt. — 4thly There are exceptions to the time of the ceſsation of the Catamenia in the middle States, the usual time as from the forty five to the fifteeth year, but some old women have them till near their death, An old women in this City whoes Age was an Hundred years, had the menses eighty of them. — Unleſs she was pregnant or giving suck. — In some they return again in extream old age after they have closed for many years. — a case of this occured in the Pensylvenia Hospital in a Mrs Pirelaine, after she had closed for twenty five years, in her seventeeth year she had a return of them. — This fact I have ascribed to Disposition in the system to renovate itself and attemptat the antediluvian age. It is like the recovery of light and hireing which often occurs in old people. — We see to the same renovation take place in trees with

the

the difference that it occurs in the latter every year in the former, not for eighty or one hundred years.— It has an analogy too with the renewal of the teeth which old people sometimes experience.— This and many other facts induce me to suppose that there will at a future period be a renewal of the antedeluvians age, but now of this here after. The menses cease, sooner in women who labor or use that excercise in the open air.— 5th They cease during pregnancy and suckling some women have the discharge in theses states but it is from the Vagina, and not from the Uterus.— It commonly occurs about the eleventh or twelvth month after parturition, and is a signal to wean the Child and renew the bisneſs of Child weaning, the quantity of the discharge varies in different seasons, it is generally from three to five ounces poſseſsed of no morbid quantity or peculiarities.— Its period of continuance four or five days, and its time of repetition, once in every lunar month in warm countries, it is most in quantity.— Perhaps from this circumstance and the filthineſs of

the old Jews, the opinion originated that the blood thus discharged was unwholsome and unclean. Hence connection with a monstrous women was forbid, and any thing very filthy was compared to monstrous Cloth. — The Jews even now have no connection with their wives till two weeks after menstruation in those. —

An important question occurs here, what is the original design of the Calamenia. - 2ndly - what is the cause of its Monthly deliverance. 3rdly - what good purpose does it answer in the female oeconomy. — Dr. Brown in answer to the first of these questions Supposes it arises from stimulus of the venerial appetite, but this opinion is as forign from the truth as it is from delicacy. — For I have seen it in many cases where the Chastity and delacy of the person would preclude such an Idea, and in many cases the system is debilitated below these parts of their appetite. but here it may be replied that it continues from habit. — I would then ask how are we to account for it in cases of monia, when the disease ap-

-pears

ppears before this Emplis? Dr Brown must be wrong; a second opinion on this subject as that it depends on fermentation in the blood of the uterus, and hence the supposed ill quantity of the Menstrous blood. But this we know cannot go on in the living animal. — A third opinion has been that there is a Sinus in the Uterus in which the menstruous blood is deposited, and accumulates monthly in the uterus Sinus. And congestion, then to be the course of it, but anatomy has proved them suppose sinuses to be more veins distended in pregnancy with blood. — The forth cause which has been supposed to induce it is Plethora this is now the universal opinion on the subject with the exception of Dr Brown, The Plethora is either general or partial. I believe it to be both - General and also that the ~~actions~~ uterus is more particularly Plethoric. —

I infer it 1st from the general Laxity of the natural system of females 2nd from the discharge in some cases being made from the lips and mouth, lungs, Eyes, Ears legs,

and

and in some cases from the tips of the   are of which an explicable by Plethora of the arterial systom. — 3dly — It has been considered as an objection, that it arises in diseases where the systom is debilitated. — As in Pthises Pulmonalis but the objection will be removed when we reflect that in this disease, there is the process of digestion and Sanguification as completely as in health so that the systom of persons laboring under Pthisis Pulmonalis is often Plethoric & hence Haemaptaesis common in that disease — and the mensis may be strictly considered as an Hemoptoesis of the Uterus. — We have to bleed more in Pthisis Pulmonalis, then in almost any other disease, owing to the plethoric State of the systom in Pthisical Patients. ——

The systom during the time of Menstruation is more liable to disease of an inflamatory tendency — hence blood letting is more proper in those cases. — This this is contrary to the old custom, to let nature relieve itself &, by this process, another objection to the theory of Plethora is that bleeding in Plethoric people does

does not prevent discharge, but this proves nothing for the Laxity of the veſsels of the uterus remaining is a sufficient reason why the blood makes it exist from that part. ——

Dr. Munro has proven that no Volues exist in the venies of the Uterus. and Dr. Sanders as well as he has considired the menstrual Blood as a Secution, how this is, I am determind in my own mind. ——

II What is the cause of the periodical return of the menses? That the man does not influence it I infer from the part, that all women do not menstrate at the same time, as would be the case if this be true, its regular recourse I have explained in the principals of aſsociation of Ideas motions which shall be considered more fully here after. — The third and last question is. What purpose does it answer in the animal Economy of females: The usual answer to this question is, that it serves to nourish the Foetus in Utero. — The objection to this. are 1st - that the females of all other animals, have no such discharge. — 2ndly the quantity of Blood discharged derived thus from the

Uterus is to considerable to explain the nourishment of the Faetus, not more then 36 oz. during Gestation 3rdly Women have been known to bear Children not only before, but after the menses had ceased to appear. — Instances of this are recorded by Dr. Haller one of which had a Child fifteen Years after the Period of catamenia, and in some the menses never disappeared. — This is a difficult question to decide on, but it may be regarded in me as a species of Philosophical cowardice to shrink from it. — My opinion on the subject is as follows. — Brutes are known to poſseſs the Venereal appitite only at certain seasons. — At these seasons they a slight inflamation, a swelling and afflux of blood to the gentel parts, there is also a dischaige of mucus which in some instances is tinged with blood. — Now this is designed I beleive merely to increase the sensibility of the organs of generation, and the distention of the Vagina and Uterus has the same object to render the pleasure greater and make conception more certain, that the mucus is increased in the parts is certain and that it increases the pleasure in the connexition of the sexes,

sexes is probable from the part that women who labor under Gonothae are highly Libidinous. 2nd Facts render my opinion of the design of the meases probable - 1st that Dr Baerhave mentions that women become Pregnant more readily immediatly before and after menstruation, than at any other time, out of One Hundred births, he says ninety nine ~~ether before~~ were conceived either immediatly before or after menstruation. 2d That women who suckle Children, seldom become Pregnant till they have menstruated once or twice - - - -

- - - - - - - - - One part here melotates against our opinion and that is that women have born Children before and after, the appearance of the menses, we before observed, that the venereal appitite commences with the menses, it is curious that generation goes on before it, but these cases can only be considered as exceptions of the general rule, for an equal departure from nature takes place, when we see women menstruate during pregnancy, yet this fact is not supposed to militate against the Supposition that the blood is disigned to nourish the Faetus. -

Wither the female Munkey has a constant Venereal desire is not yet ascertained, it is certain that the male has at all Seasons, does not his analogy if it obtains afford us a good reason for our supposition—? That a certain ~~of~~ degree of distention or sence of fullness, sensibility necessary to conception I am convinced.

Let us next enquire into the Pecularaties of the male Constitution, here we need say but little as we have mentioned the different Functions of the animal as going on in the male, and afterwards pointed out where the female constitution differs from it, I shall only mention here the external organs of generation, which you will hear to more advantage from the anitomical Chair.— I proceed to mention the changes, which the male sex undergoes at puberty.— These are an enlargement and spreading of the bones of the nose.

2nd A certain hoarseness in the voice accompanied with a cough, called the forteenth year cough or cold, an eruption on the chin and Face followed soon a beard, Venereal diseases are

now first experienced. — The whole system undergoes a change, becomes more vigorous and roburst the mind suffers as great a change, as the body, it acquires a vigor, to which it was before a stranger. — This change usually occurs about the fourteenth year, tho' some latitude is here allowed. — Haller has known cases, where the signs of Puberty made their appearances before the third year — a beard &c. — The above change have been by some atributed to an obsorption of the semen and its stimulus. — The argument in favor of this Hypothesis are derived from Eunuchs and from the number of Lymphatics seated about the Testes and Seminal Vessels. — The Idea is intirely Hypothetical. — The use of the Lymphatics, is merely intended for the purpose of carrying away all Lymph from the Semen and leaving it as pure as possible. — 2ndly It may be accounted for from the stimulus in the Vesiculae Seminales and Sympathy, with the whole system, the stimulus has in some cases produced mania and even death. — Again they cannot prove the existance of Semen in any part of the body, but the vessels adapted

for its secretion and detention which the could do were it obsorbed, we infer from analogy, but it acts in the way I mentioned. — Wine and Opi produce effects on the senses and mind, some what similar to those of puberty, Vigor and exhileration long before they can be supposed to have entered the circu~~mstance~~lation — again the alteration which takes place in the system during Pregnancy has some analogy with these, Nausea and in some cases Syncope are induced by the Stimulus of distention in the womb, by sympathy with the Stomach This induces in some cases an enlargement of the mouth, and change in the color of the skin, called by the good women Morph, — In females the change at puberty, may be explained by the tension induced in the avena, if this be discharged, they become fat in the same manner that Eunuchs do who have the stimulus of the semen obstracted in both, these cases direct dibility is induced which predisposes to obesity, which I consider a disease. — The same thing happens from the obstruction of any other Stimulus

deaf people become languid from loſs of hearing. — The shillneſs of the voice, and loſs of beard in Eunochs, I atribute to the same cause. debility In healthy men, the sudden ~~of~~ obstruction of those Stimulus, from exceſs in venery, is attended by leſser diseases of the same debility. Nothing can be infered from the number of Lymphatus, except that nature has been carefull to take away all superfluous moisture from the Semen. — Farmers will know, that debility is induced by castration. An ox is by no means so strong as a bull, a Gelding is never so good a racer as a Stone horse, oweing solely to this cause. — The fluids at puberty are more athrabeent, and the smell perceivable in some animals, at that time, this merely arrises from a more vigorous circulation which increases the tone of the whole systom, this is most observable in, had working people. — The opperation of the Semen, then I conceive to be merely by its stimulus. — We have now Gentlemen brought they 2 sexes to that period of life, in which they are able to perform the duties of propergating their species, in brutes

the venereal appitite coeval almost with their existance. — But in man the case is far different and it is propper that it should be so. The brute creation have their sustainance prepared ready for them, the moment they emerge from their mothers womb. — But man has ~~his~~ to Earn his bread by the sweat of his brow" and it is right he should learn how to maintain a Family of Children before he forms connections, which he knows is calculated to produce one.

Lecture 21st

At our last lecture Gent. we considered the peculiarities of the sexes, and conducted them to that period of Life, where they are to propergate their species. — In women sixteen is the earliest, and in men twenty one for Marriage. — The later they leave as twenty four in women, and thirty in men. — I say provided it does not exceed that age, the leſs liable they will be to be injuered with the exceſs of venery, and the woman from child bearing. — However the venreal appitite may be abused by immoral purposes. — Yet to the human Speices, it was given as a great bleſsing. Much disputes concerning the propriety of matrimony, has been held from the paſsage in which our Saviour is asked by one of the Publicans "is it good to marry" — he answres: There are Eunuchs from their mothers womb, and there are Eunuchs who have been made so by man, and moreover there be Eunuchs who have made themselves so, for the Kin~~tt~~gdom of heaven sake. — If any of you now

can here these things let him hear them. and &c. This has been falesly construed in an argument in favour of Celibacy. — I say falsly for it admits of a directly opposite construction. — It appears if our Saviour being appealed to on a subject of so delicate a nature, and which concerned a universal principle of humanity, the venerial appitite answers as if he wondered at the folly of such a question. — The invesolity of the venereal appitite, proves it to be the intention of our Creator that it should be injoyed, and if it were not, the distinition of the human race must be the consequence, which he can never have intended. — So that what has been supposed an argument in favour of Celibacy, is in my opinion a strong one in opposition to it. — It is impossible for the human subject to live without possessing this appitite. (Here is a contradiction with what Dr. Rush observed when speaking of Dr. Browns opinion of the cause of menses) (R.C.) It appears to prevail in every state or condition of the system in a greater or less degree. The convalescent from

fevers

Fevers the moniac the Hypachondriac poſseſs it, we see it is not entirely extinguished in a palsy Hysteria Apoplexy &c. &c. &c. It appears to stimulate strangly, the convalescent from malignant fevers and the Ideas.— During the prevalence of the Yellow fever in this city, In the Year 1793 the convalescent from that disease at bush hill indulged in a most criminal gratification of their immorral desire.— Gibbon informs in his account of an Earthquake in the time of Justiman which distroyed the City of Lisbon, that numbers of men weare seen commiting rapes on women who were flying in the greatest terror from the shocking seen of deſsalation in the above cases it must have been morbid. Mr. —— —— mentions the case of an Ideot, in whom the venereal desire was remarkable strong. Montaigue mentions a case of a man in whom the genital organs were scarcely visible, when venerial desires were very ~~strong~~ accute The Idiot who lives near Poſsyunk falls in N. Jersey

falls. N. Jersey has a great inclination to be married. – Even old age does not in every case. The famous Thomas Parr was convicted of adultry at a Hundred and twenty Years of Age, and our daily papers frequently inform us of Persons about seventy who do homage to this universal practices. Neither reason, Religion, disease or deformity are able to distroy it. – It is a wise provision of heaven to prevent the distruction of the human race. – What human being without these desires would form a connection with a person of whom he knew very little of, and risk his happiness for life? or who were it not for this Passion would undertake the expence and difficulty of raising a numerous family of Children. – If nature never intended man to spend his life in the pursuit of these small gratifications, or she would have given him more enjoyment than the brutes, which is not the case. – Man is confined to the enjoyment of one Women and wisely, for he would debilitate and perhaps distroy himself, wear he like brutes allowed

the privalege of every women he met his sys=
=tom is unable to bear it. — Many instances
have occured of death from this cause — one
of the most celebrated of the Italian Printers
lost his life by the enjoyment of six women
in rotation. — The design for the propagation
of the species is not confined to man. —
The horse, the Bull, the Ram, the Baor
all are sensibly alive to it, in some it ap=
=proaches allmost to madness — in the Am=
=phibious Animals, the pleasures are still
greater. — "Turtles continue their amorous
for three or four days" and toads remain in
the same situation for eight or nine days.
Shalangani informs us that the pleasures of
frogs from this Scene are so exquisite that
they do not mind any bodily pain while they
enjoy this gratification he amputated th=
=eir legs, and could not seperate them
and many of them would only relinquish
his female with his life. — Had man been
formed and intended for this gratification
only, he had surely been more capable

of receiving pleasure, than brutes, but he was formed for nobler purposes, and the venereal was given him, merely to prevent him neglecting that duty which he owed to posterity. I proceed next to generation, it is with diffidence Gent. that I enter on this subject. — Clouds and drakneſs have long dwelled upon it. — After micriscopes had been used to investigate different parts of the animal Economy Ammaleutae were perceived floating in the semen mas: a beneuolt theory was immediately formed, in which the Uterus was ~~formed~~ supposed to serve the purpose merely of a matrix to the Embryo, which was supposed to exist in the male semen. It was reserved for Spallangani to diſsipate the darkneſs that hung over generation for experiments made on bitches and Amphibious animals he has rendered it probable if not certain, that the Embryo is not contained not in the male Seed, but the female ovaria, and that they male seed acts only as a stimulas, exiting the Embryo

contained ~~th~~ in one, he is wakened from his long sleep by the stimulus of the female Eggs into action, you recollect that Mr. Hunter has asserted Semen is highly and Stimulent and pungent. — Thus you see Gent. my Ideas of animal life are further illustrated, Stimulus is necessary not only as I before have said for the support of life but for the productions of living animal! (* Death is our natural state we are forced into existance by stimulas and kept existing by Stimulus. — When the Stimuli is obstructed death ensues.) —

The manner in which the process of Generation is performed, is as follows. — The male seed is ejected in the act of Coition and received into the cavity of the Uterus. — How is it brought in contact with the ovum? I answer by obsorption, it has been commonly supposed that the Fimbre grasped in Coition one of the ova and convey'd it into the Uterus where it came in contact with the male seed. This opinion I do not adapt 1st. because Faetus is in ovaris and falls upon tubes. —

2ndly because the Uterus remains unperious and closed during conception.— 3rdly because impregnation has been known to take place in cases when the Semen was not conveyed to the Uterus as by a penis not a quarter of the ordenary length.— When it has only been introduced into the enterence of the Vagina— While I was studdying in ~~Eding~~ Edinburgh a Student of Madecine was oblidged to marry a Girl, who swore he had got her with Child.— He assured me in the most solemn manner that he had not, nor even violated ~~her body~~ the cage of her vergenety Still without the rupture of the Hymen impregnation took place Dr. Lunder delivered a woman whoes Hyman was not Ruptured and Dr. Johnson relates several simelar cases.— 4thly It has been supposed that the ovaria are separated by the energy of the venerial orgasm. But there are instances where this will not explain it as in Rapes.— I have said from observation in favour of this opinion, I will relate an

experiment of Spallanzi he disalowed three grains of Semen of a Toad in a pint of water, one drop of this liquor impregnated a female, when intraduced to the vagina now if so small a quantity as was contained in one drop of this water is sufficient for impregnation, can we have any difficulty in supposing the semen to be absorbed enter the inculations and a portion of it came in contact with the ovum? This opinion was Dr Hanely and I know of men more rational or probable.—

The Reason why the Semen produces no ill effect in the system by its absorption, is that it is a specific Stimulas capable only of producing this one action, just as varalus matter will opporate on the stomach, and the whole mass of blood would dilute the quantity of semen emitted in copulation more than the pint of water did the Spirm of the frog, no more happens here than in persons, but why need I mention poisons? a Single grain of   Sublimate has been known to produce Salivation, From

its being a spesific stimlus no inconvenience results from unfruitful connections. — If this theory be unsatisfactory, I will mention a nother Mr. J. Hunters, all Secreting passages have a peculiar pinstaltic motion as is evident in the Uterthra in Gonorchal, in the Trachea, in the bowels, Stomach, and there is Sometimes a reversion of this peristaltic motion, as is seen Cordolgia ———— or water Brash — may not the Fallapian ~~Frath~~ tube and Vagina in like manner have a reversion of the Peristaltic motion and one of the ova be thus conveyed by the motion of the Fallepian Tube to the Uterus? This will account for impregnation in cases of short penis and unruptured Hymen, But as it is entirely from analogy it may be objected to a Hypothetical, and it certainly is more so than Harveys. — Several circumstances influence a belief of this theory, as first The cativity of the male Seed. The absorbing powers of the vagina. Excitability of the avaria. Hence after Menstravations which increases the excitability

women as more easily impregnated, also after long absence from food; after a fit sickness a journey a voyage &c &c. To a foreign Country That has a remarkable influence on the generative powers of animals. Revd. Mc Calley mentions that sheep when brought from any neibouring Island to St. Kilda which had left off copulating became pregnant soon after their arrival there.

The nausea, which is induced in conception is entirely oweing to the Sympathy of the system with the avoria and Gallapian Tubes — The avaria being at the moment placed in the Fallopian Tube, and lodged in the Uterus by its motion, we see a Hundred smaller effects from mechanical and chemical Stimuli — I shall mention two cases of the kind, some what ~~sima~~remarkable — a Lady in this City always experiences before the commencement of her breeding sickness a coldness in one of her legs Succeeded by a Glowing heat in the part Dr. Harle a Gent. of Respectability in New Castle mentions

a case of a woman who always knows the time she has conceived, by a great passion or inclenation to steal every thing which she comes across — The Fenal cause of this Nausea according to Mr Hunter is to guard the systom against inflametory complaints. — It is not a universal occurrance, I have known two cases of Pregnancy in this city, in which there was no sickness at all, and in some it is so violent as to induce great disease — I have known some cases where the patients were unable to sit up for three or four months How long is the avum before it passes to the Uterus? I answer the whole business is carried on in the ovoria — It may be composed to a hot bed where the plant first requires life and vigor. The Uterus may be confuted as a large house where it is nourished and required strength to resist the action of the season and air. Hither to I have spoken of the semen as a secreted Liquor of a peculior kind, it is formed, not only from the fluids, but the solids of the body, hence it is not formed

till the body has acquired its full growth till puberty. — The absorption of the Liquor, was formerly supposed the cause of the alteration of the system of that age, but it appears to be an effect that is the secreter of the semen is not performed till the body has this vigor. It is derived not only from the body but the mind! every part of the body clubs its proportion to this secretion, and the mind influences it. The formation of the ova, is the cause of the change, in females at the same period. — I say every part of the body clubs its proportion, this attains also in women. hence children resemble their — parents. This resemblence has been explained upon the supposition that the Early looking ~~after~~ at the parents, had that influence but it occurs in cases before this cause could have opperated. — but we have an analogues to favour our supposition that the above ~~cause~~ is the true cause that effects partake of the nature of their causes Thus a shake on the face with the hand, shews the

mark of every finger, we see it also in vegetables; the influence light has on the Calor. — Again in Chemistry we have instances — Again in Chemistry we have instances of the results produced partakeing of the nature of their componant parts. — Dr Charnas has supposed the reason why Bastards commonly possess such great minds, which is a fact to be the vigor of the minds of their parents; which is produced by the stratagems made use of to accomplish their purpose, and the ease with which it is necessary for the mothers afterwards to conceal her situation and prostitution. — We should proceed agreeable to the order laid down in our Sylabus to consider the formation of the Fœtus in utero or conception, but this you will hear to greater advantage from the anitomical Chair. —

Parturition comes next before us, The usual period of pregnancy in nine months, Tho' some latitude is here allowed, some instances have occurred of women being

with child thirteen months and five & months is the shortest time ~~is the~~ ever known of living children being expelled from the Uterus. Five and thirteen months have been mentioned as extreams. Harvey relates a case of a child ~~being born~~ living who was born but six months after pregnancy. — It will be of importance to you, to know this fact as the peace of families, may in some cases be preserved, by the knoledge of it and the order of society. — The history of extra Uterine Factuses and super Faitations belong to Pathology, at the close of the period of Gestation the fetus makes efforts to free itself from confinement, or change in the position of the childs head, this probably first produces the throes of the mother, which are extreamfull, death is sometimes induced merely from this pain. — Pain has been supposed neceſsary to child birth, this I do not beleive to be the case, it is true it was this case pronomined in the female sex for the Proſsion of one a four

first parents.— But I think it may be obviated for the same being pronounsed as the punishonent of men that he should earn his bread with the sweat of his brow, yet how many are there who live without working? By the ingenuity of man, this charge has been obviated, and I think it probable the other may too.— In some parts of Africa, we are told that women, bring forth children without pain, and Mr. Brillain informs us that the women in Sicili have but verry little pain in porturitaon.— The Turkish women we are told mitigate their pain by drinking Sweet Oil for two or three months of their pregnancy, it acts by inducing debility of the Alumentory Canal.— I have uniformly observed that weekly women & delicate constitutions have easy labors, and I have frequently observed bleeding to mitigate very much the pain of labor.— In all cases of every birth there is direct or indirect debility— This is usually Chronic, but I conclude, that if debility of a more temporary nature could be induced it would answer the same

purpose either indirect debility or debility from obstruction of stimuli From the effect of copious Bloodletting ordered by Dr. Physick in a case of dislocated humerous at the Pennsylvania Hospital, who was reduced with great ease to the opperator and but little pain to the patient. — I think it will be poſsible to obviate, in some measure to obviate or at least to mitagate the pains of labor. — we are as yet unaquainted with the effects of bloodleting or a dose of opium of sufficient force to induce complate Syncope for a short time could this be done, I think the labor could be easy. — I am the more disposed to this opinion from a fact, that a case of labour was void of pain in a fit of Epelipsy — a women Subject to epileptic fits was pregnant, and deliverd of a Child in one of her fits withoutout pain. — I am perswaded Gent. that the time will come, when the Pain ~~will~~ of Childbearing will be as certainly and uniformly mitagated as than of a fit of the cholic. — The marks which are sometimes

found on children bodies &c. How are they produced. — This effect has been atributed to the imagination of the parents, but, this has been proved not to be the case Dr. McCauley of three thousand cases which he had under his inspection, none proceeded from this cause. — In some the longing of the Mother was for Clarret the child had no mark. — Where it was for cheese the child was frequently marked with clarret, but in no one case of near three thousand was the child marked by the imagination of the mother. — I can only explain it by Effusion upon the delicate skin of the Foetus. —

We should next in the order of our Sylobus speak of the different stages of life, but we have already shaken off Puberty, and the others will come in more properly, when we come to speak of the diseases. Peculiar to each, till which time I postpone this consideration. —

The next subject is the analysis of the fluids and solids of the body. Of the fluids, the anaylisis

analysis of some I have mentioned when treating of them. - The changes they undergo in diseases will be noticed in our Pathalogy. -

With this then Gent. I conclude my account of the functions of the human body in a healthy state and also of the mind. - We have seen men in whom the function were carried on in a pleasent, easy, regular exact manner. - This is what consitutes health, or health may be defined. - That state of the system in which the excitement, and excitability are in an exact rates to each other, and both equally deffused through every part of the body and mind, this definition admits of considerable latitude, it excludes strength altogether from health the most effeminate Citizen who cannot bear the rays of the sun, or a nothern blast, may be equally healthy, with the most robust hardy working peasent, who can stand all seasons and changes, without inconvenience. - If health consisted in the quantity of strength, a man would always

be made healthey than a child, which is not the case.

Is it possible for a man to be always in good health? on this subject there have been two opinions, some have supposed it possible to exist forever in good health. Mr Price was formerly of this opinion, but to his Credit he has changed it. — Those who are in favour of this notion, derive it from the alchimists. — The immortability, is to result from certain improvements in Phylosophy. — But it is irreligious for "dust thou art, and into dust thou shalt return" we live by force. Death is the natural state of man. — Paracilus death nearly put a stop to this way of thinking, he contrived an elexer cold Elexir Propriatatis. — Which he supposed would preserve health and make him immortal. What might be the effect of bleeding repeated every now and then in preserving health and long life. — The Germans make a practice of this in the spring season, notwithstanding all that has been said

in opposition to this; I believe, that we shall at a future time attain the antediluvians age. May there not be a quantity of latent excitement in the system which we no not of, which if used with aeconomy may last us a thousand years? And is there not something like a pint at this in the Scriptures where one of the propels says that man shall be a boy at one hundred years old, he must mean that mans age should be such at a future time as will bear the same proportion to one hundred years, that the usual period of a persons life now does to ten years. The means of his antediluvian longivity will be probably of three kinds, Physical moral and rational. —

The changes of the earth, in which will be dried up Sources of putrifaction and of course, the influence of Religion which will prevent many diseases which are now common which will conduce toward this desirable effect. —

We must now Gentlemen take the last

pleasent veew of the body of man in leaving this subject I feel as if I were going for the last time on a splendid pallace disposed to ~~antediluvian~~ distruction by the hand of time or of war for both the body and mind of men are exposed to a thousand dangers as in a state of actual warfare, disease and pain are the consequence of those dangers. - We have veiwed him erect and ruddy, his bones filled with marrow, his Eyes sparkling with health his vessels tinged with blood, the senses and faculties in perfect order and in unison with the faculties and opperatition of his mind. - To explain the causes of the diseases, to which he is exposed, will be the business of Pathology, and this we shall commence at our next lecture. - here Dr. R. recapitulati-pis theory of animal life. -

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